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Mandatory Quality Disclosure and Quality Supply: Evidence from German Hospitals[1]

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Abstract

Using a newly constructed dataset on German hospitals, which includes 24 process and outcome indicators of clinical quality, we test whether quality has increased in various clinical areas since the introduction of mandatory quality reports and the online publication of part of the collected quality measures. Our results suggest that process indicators of clinical quality have increased significantly in 2008 compared to 2006. In addition, the hospitals underperforming in 2006 appear to have increased their clinical quality relatively more than the other hospitals. When instead quality is measured by outcome indicators, average clinical quality is estimated to have increased for underperforming hospitals and decreased for the best performing hospitals in 2006, so that on average across all hospitals the changes in outcome indicators are insignificant for just more than half of the outcome quality measures. We further show that the best performing hospitals in 2006 in terms of outcome quality measures experienced an increase in their share of patients in 2008, thus providing indirect evidence that patients react to disclosed quality. Interestingly, the best performing hospitals in 2006 in terms of process quality measures did not experience a significant change in their share of patients in 2008, thus suggesting that patients react more to output than to process measures of quality. Finally, for the subset of hospitals who offer services in obstetrics, we find that higher competitive pressure, measured as the number of competitors in a given radius, is associated with a higher increase in quality following quality disclosure. We argue that the latter effect is unlikely to be due to selection of patients by hospitals.

Key Words: health care; hospitals; quality disclosure; quality competition; Germany

JEL Codes: I11; I18; L15; C23

[1]The data on hospital quality used in this work were obtained from quality reports (2006 and 2008) produced by the hospitals according to § 137 Abs.3 Nr.4 SGB V. More information is available at www.g-ba.de.

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1. INTRODUCTION

Quality is often said to be of higher importance in the health care industry than in any other goods or services industry. First, albeit to some extent trivially, the impact of the quality of the health care industry on the well-being of citizens is undisputable. In fact, higher quality often implies also a higher chance of survival. Second, it is generally believed that, in the health care industry, quality is the main strategic dimension in which hospitals compete, or at least should compete, as prices in many countries are regulated by the government and consumers do not face those prices fully due to the presence of health care insurance.[3]

However, in order for quality competition to work in the hospital industry, communicating quality information to decision-makers, whether patients or their physicians, is crucial. Indeed, health care services are examples of experience, if not credence, goods[4]: patients are unable to assess ex-ante, and sometimes even ex-post, the quality of the treatment they receive. Information on hospital quality can thus be gathered only from previous personal experience or experience of friends, relatives and acquaintances. As a result, a patient's estimate of a hospital's quality is noisy. Thus, unless objective quality measures are reported to them, patients or their physicians cannot choose optimally based on quality. In markets characterized by experience or credence goods, in the absence of external quality information, firms face lower competition.[5] One possible solution, as proposed by Brook and Kosecoff (1988), is developing credible quality measures for hospitals and publicizing the outcomes for these quality measures. As noted by Ginsburg and Hammons (1988), government production of information on quality may be an important component of a competitive system".[6]

For these reasons many countries, particularly those whose governments aim to introduce competition in the hospital sector, have witnessed the introduction of policy measures favoring the disclosure of quality information to patients. An example is the UK, where in July 2010 the new coalition government issued a white paper titled "Equity and excellence: Liberating the NHS", which was followed by public consultations. A key idea behind the proposed reforms was that competition can be used to promote better health outcomes.[7] In

[3] For early models of quality competition among hospitals see for instance Joskow (1980) and Dranove and Satterthwaite (1992).
[4] See Cutler (2002).
[5] See Nelson (1970) for an early contributions on how limited information decreases competition in an industry.
[6] Ginsburg and Hammons (1988), p. 109.
[7] Lyons (2010), pp. 1.

this regard, patients are to be provided more freedom to choose and more information which will help them choose. As funding will be based on those choices, it is expected that the health care providers will have the incentive to provide services in higher quality to attract patients. Another example is Germany. Quality disclosure by German hospitals is mandatory by law since 2005[8]. Hospitals failing to gather and report quality data face financial penalties.[9] The quality measures, relating to different modules (either procedures or diseases), are defined by the Federal Office for Quality Assurance (Bundesgeschäftsstelle Qualitätssicherung or BQS). The latter also decides which of the quality measures will be made public. In fact, since January 2007 at least, some quality indicators are available to the public at websites such as http://www.bkk-klinikfinder.de/.[10] On the latter website and on similar ones, which can also be easily reached from the websites of most German insurance companies (such as KKH-Allianz, HKK, DAK-Gesundheit), it is possible to search for a hospital in a given geographic area which is active in a given medical field. As a result of the search one gets the names and locations of the hospitals and some simplified information on quality.[11]

If competition occurs in quality and communicating quality information makes the market more competitive by informing decision-makers about the available choices, we would expect an increase in clinical quality of hospitals following disclosure of quality information to the public. [12]

Our paper tests whether it is indeed true that quality increased in German hospitals following quality disclosure. We do so using a newly constructed dataset which contains information extracted from the above quality reports. To our knowledge, we are the first in the economic literature to use these data.[13]

[8] § 137, paragraph 3, sentence 1, No. 4 SGB V.
[9] If a hospital reports less than 80 percent of cases (revealed through the number of respective reimbursed cases), payment is reduced by 150 € per missing case. See Busse et al. (2009) for more details.
[10] Many other websites provide the same information. Among these are *http://www.weisse-liste.de/*, *http://www.deutsches-krankenhaus-verzeichnis.de/* and *https://www.tk.de/tk/klinikfuehrer/114928*.
[11] See the Appendix for more on this website.
[12] In fact, at least to some extent, this increase in quality could also be wasteful if it gave rise to a medical arms' race. See Dranove et al. (1992). We do not address the issue here. It might also lead to a reallocation of efforts from tasks whose quality is measured and made public to tasks whose quality is not measured or not reported. See Lu (2012). Again, we cannot address this issue with our dataset.
[13] For a review of the literature addressing the question of whether quality disclosure improves quality see Dranove (2011).

Compared to similar empirical studies, we employ a much wider range of process and output measures of clinical quality for a wider number of service areas. For instance, Chassin (2002) analyzes the New York State Department of Health's reporting program and finds that deaths from cardiac surgery fell 41 percent over the first four years of the publication of the report cards. Werner et al. (2009) examine the impact of public reporting initiated by the Centers for Medicare and Medicaid Services (the Nursing Home Quality Initiative), and find that both unreported and reported care improved following the launch of public reporting. They use report card scores on the percentage of patients who have "no pain", "no delirium" and who enjoyed "improved walking". Likewise Lu (2012) reports that scores of quality measures improved after the introduction of the Nursing Home Quality Initiative in the U.S. for the reported dimensions (*"percent of residents who need help with daily activities"*, "*percent of residents who spend most of their time in beds or in chairs", "percent of residents who lost ability to move about in and around their room", "percent of residents who lose control of their bowels or bladders", "percent of residents who are more depressed or anxious").*[14]

We first investigate whether hospital quality, measured by 24 different indicators, has changed in 9 different service areas in Germany since the publication of quality measures. [15] To our knowledge we are the first to distinguish between process and output quality measures in this context. We then examine if this change differed across hospitals depending on their organizational form (for profit, not for profit, public), on their academic status, on their size or on their different initial performance levels in 2006.

Our results suggest that process indicators of clinical quality have increased significantly in 2008 compared to 2006. We find no significant change for hospitals with different characteristics, including different organizational form. This result is in line with Lu (2009) who reports that nonprofits were as responsive as for-profits to quality disclosure following the Nursing Home Quality Initiative in the U.S. However, the hospitals underperforming in 2006 appear to have increased their clinical quality relatively more than the other hospitals. According to Dranove (2011), a similar result is found in Chen (2008) who built a theoretical model of vertical product differentiation and found that following Medicare's Nursing Home

[14] For an extensive review of quality disclosure in health care and quality measurement see Dranove and Zin (2010).
[15] For a definition of process and outcome indicators of quality and a discussion of the advantages and disadvantages of using one versus the other, see Mant (2001).

Quality Initiative all nursing home raised quality but that lower-quality nursing homes improved relative to high-quality nursing homes.[16]

When instead quality is measured by outcome indicators, the changes in outcome indicators are insignificant for more than half of the outcome quality measures in a regression including all hospitals. Yet average clinical quality is estimated to have increased for underperforming hospitals and decreased for the best performing hospitals in 2006.

We argue that the latter result, rather than to a simple reversion to the mean, may be due to an increase in patients with higher severity diagnosis that chose better performing hospitals as a result of the publication of the quality reports. Indeed, we show that the 2006 best performing hospitals in terms of output measures witnessed an often significant increase in the share of cases in 2008 with respect to 2006.[17] Our findings are in line with those of Werner e al. (2012) for the U.S. They found that the relationship between nursing home quality on post-acute care, as reported by the Centers for Medicare and Medicaid Services, and nursing home choice was positive and statistically significant suggesting that patients were more likely to choose facilities with higher reported post-acute care quality after public reporting was initiated. However, they found the magnitude of the effect to be small and concluded that there was minimal consumer response to information. A stronger response by patients to quality disclosure is reported in Varkevisser et al. (2012) for the Netherlands. They examine the relationship between hospital quality, as measured by publicly available quality ratings, and patient hospital choice for angioplasty using individual claims data from a large health insurer. They find that patients have a high propensity to choose hospitals with a good reputation, both overall and for cardiology, and a low readmission rate after treatment for heart failure. However, they note that since readmission rates are not adjusted for case-mix they may not provide a correct signal of hospital quality, so that patients basing their hospital choice on such imperfect quality information may end up making suboptimal choices. Our results would seem instead to differ from those of Wang (2011) for Pennsylvania. They examine the impact of CABG report cards for coronary artery bypass graft (CABG) surgery providers' report cards on a provider's aggregate volume and volume by patient severity.

[16] The result does not appear to have been published yet. So we can only cite it indirectly.
[17] Also for a review of the literature addressing the question of whether quality disclosure improves consumer choice see Dranove (2011), Section 5.3.

They find that a reduction of poor performing and unrated surgeons' volume but no effect on more highly rated surgeons or hospitals of any rating.

Interestingly we find that the 2006 best performing hospitals in terms of input measures witnessed a generally insignificant increase in the share of cases in 2008 with respect to 2006. This might be due to the fact that patients (or their physicians) value more information on output measures of quality than on input measures of quality when choosing among hospitals. We believe this is not implausible. Indeed, Bundorf et al. (2009) examine the effects of providing consumers with quality information in the context of fertility clinics providing Assisted Reproductive Therapies (ART) in the U.S. They report that clinics with higher birth rates had larger market shares after the adoption of report cards relative to before and that clinics with a disproportionate share of young, relatively easy-to-treat patients had lower market shares after adoption versus before. They also found that report cards had larger effects on consumers and clinics from states with ART insurance coverage mandates. They conclude that not only consumers respond to quality report cards when choosing among providers of ART but they also take into account information on patient mix when evaluating clinic outcomes.

Finally, for the subset of hospitals who offer services in obstetrics, whose distance from each other we could measure, we estimate the impact of competition on the quality differentials between 2006 and 2008. We use the number of competitors in a certain radius as a proxy for competitive pressure. Our results suggest that there is a significant and positive effect of competition on the increase in quality which followed quality disclosure. According to Dranove (2011), a similar result is found in Chen (2008) who found that the Medicare's Nursing Home Quality Initiative raised quality more in more competitive markets.[18] To the best of our knowledge, no other paper addressed the issue. However, more generally, our findings are consistent with empirical and theoretical studies suggesting that higher competition raises quality.[19]

[18] See note 16.

[19] There is a substantial literature on the impact of competition on quality in health care markets, both when the price is regulated and when it is not. Theoretical models predict that when price is regulated and regulated price is above marginal cost, higher competition increases quality. Such a finding seems confirmed in the empirical literature. For an early contribution see Robinson and Luft (1980). See instead Gaynor (2006) and Gaynor and Town (2011) for a review.

Using national data on Medicare patients at risk for cardiac surgery, Dranove et al (2003) found that cardiac surgery report cards in New York and Pennsylvania led not only to improved matching of patients with hospitals but also to selection behavior by providers. They evaluated that, on net, this led to higher levels of resource use and to worse health outcomes, particularly for sicker patients. They concluded that, at least in the short run, these report cards decreased patient and social welfare. However, we believe there is no evidence in our case that the positive effect of competition on the quality differential is due to hospitals facing more competitive pressure rejecting more patients with severe conditions. Indeed, if such an effect were present, we would expect it to play a role mainly, if not only, for outcome measures of quality, as these are the ones more likely to react to a change in the severity of patients. Our finding on the impact of competition on the quality change is instead not affected by whether the quality measure is a process or an output measure. This is to some extent in contrast with Bijlsma et al. (2011) who found that competitive pressure explains the cross-sectional differences in quality for process measures but not for outcome measures.

The remainder of the paper is organized as follows. Section 2 explains the institutional background of the health care industry in Germany. Section 3 provides an overview of the dataset we use. Section 4 presents the empirical strategy. Section 5 reports the estimation results and discusses the empirical findings. Finally, Section 6 concludes.

2. THE GERMAN HEALTH CARE SYSTEM

As stated by Busse et al. (2009), the German health care system is dominated by its statutory health insurance. As of 2008, this statutory health insurance scheme was operated by over 200 rival health insurance funds. Participation in one of these funds is compulsory for employees whose income is below a certain level (around €48,000 per year), the retired and the unemployed, and for other specific groups such as farmers etc. Contributions are determined as a percentage of income. As of 2008, the statutory health insurance scheme covered about 88 percent of the population. 10 percent of the population was covered by private health insurance, with civil servants and self-employed being the largest groups excluded from the statutory health insurance. Less than 1 percent of the population had no insurance coverage.[20]

[20] For more detailed information about the scheme, coverage and premia see the following web document: http://www.allhealth.org/briefingmaterials/CountryProfiles-FINAL-1163.pdf

Furthermore, general practitioners have no official gatekeeper function. More generally, patients are free to choose ambulatory care physicians and hospitals if inpatient care is needed. Ambulatory care in all expertise areas is mainly provided by physicians working individually. Insurance funds bargain with the regional associations of physicians on a yearly basis to set aggregate payments.

There are a bit more than 1900 hospitals providing inpatient care and receiving diagnosis-related group payments from social health insurance funds and private health insurance companies in Germany. Following the definition of the Statistical Offices of the Lander, three hospital types are identified in Germany: public, for-profit and non-profit hospitals. As noted by Herr (2008, p.1058), non-profit hospitals are operated by non-profit organizations such as churches or miners' associations. The private for-profit[21] segment has been growing recently (approximately one-sixth of all beds) via takeovers and privatization of public hospitals.[22] Overall, as reported by Tiemann and Schreyögg (2009), the total number of hospitals in Germany has fallen and an increasing number of hospitals have been privatized over the past decade.

Furthermore, since 2000, the German government has introduced a range of policy reforms such as managed care tools and structures (Reform Act of Statutory Health Insurance 2000; Statutory Health Insurance Modernization Act 2004; Statutory Health Insurance Competition Strengthening Act 2007). According to Schlette et al. (2009), these reforms, inter alia, aimed at inducing competition via selective contracting among providers and payers. However, this is a rather gradual process where health policy-makers are guardedly supporting selective contracts while trying to sustain a system with equal access and service quality for the insured population.[23]

3. THE DATASET

The quality data is obtained from the Federal Office for Quality Assurance (Bundesgeschäftsstelle Qualitätssicherung or BQS). The BQS currently focuses on measuring quality in hospitals. Since 2005, quality disclosure by hospitals in standardized format is

[21] From a legal point of view, both for-profit and non-profit hospitals are private, i.e. nonpublic.
[22] http://www.allhealth.org/briefingmaterials/CountryProfiles-FINAL-1163.pdf
[23] See Busse and Riesberg (2004), pp. 212.

mandatory in Germany by law[24] every two years[25], and hospitals failing to gather data face financial penalties[26].

The quality measures are constructed for so-called "modules" (either procedures or diseases) by the BQS itself. Most of these measures refer to procedures such as cholecystectomy, hip replacement or pacemaker implantation. The original dataset collected by the BQS includes quality information for around 200 indicators relating to 26 modules. Busse et al. (2009) state that this database is considered to be the largest database monitoring quality in the world. The data are reported by the hospitals themselves and mostly made public at the aggregate national level. Furthermore, hospitals, which are labeled by the BQS as "underachiever", are asked to explain this outcome in a nonpublic process and, if seen necessary, requested to take measures to improve performance.

The information in this dataset can be divided into three subcategories: hospital characteristics (such as ownership status, academic status, number of beds etc.)[27], process measures of quality (e.g. measures evaluating whether certain processes indicated in clinical guidelines are administered) and outcome measures of quality (e.g. measures assessing the result of medical treatment(s) provided to patients).

However, not all of the dataset is publicly available. In the 2006 and 2008 waves of the survey only 28 and 29 indicators respectively were published in standardized reports. In fact, most of the outcome measures are not publicly available, since the BQS has argued that an appropriate risk adjustment would require the documentation of a variety of concomitant diseases, and would thus lead to a an excessive burden of documentation for hospitals.

The standardized reports are available online, which enables the public to search for information on quality by hospital or location.[28] In addition, the BQS makes available to interested researchers the standardized reports in xml format. One report is published for each hospital. Hence, for each of the years 2006 and 2008 more than 1900 reports were published.

[24] § 137, paragraph 3, sentence 1, No. 4 SGB V.
[25] The first wave of data, relating to 2006, was released in 2007.
[26] More precisely, if they report less than 80 percent of cases (revealed through the number of respective reimbursed cases), payment is reduced by 150 € per missing case.
[27] These hospital characteristics are called in the reports *structural* measures of quality. However, for most of them, such as the ownership structure, it is hard to argue that they are measures of quality.
[28] More explanations can be found in the appendix.

We extracted the relevant data using a computer program which exploited the standardized format of the reports to recover the relevant variables.[29]

In addition to the mandatory quality data, hospitals can also provide additional information on a voluntary basis. Yet, in such a case there is no standardized format, so that comparisons, whether across hospitals or in time, are difficult. Also, clearly the provision of this additional information is endogenous with respect to the score achieved by the hospital in the quality indicator.

Hence, in the current study, we employ 24 standardized quality indicators in 9 treatment areas as measures of clinical quality.[30] These are reported in Table 1. Twelve of these quality indicators are input or process measures, while the remaining twelve are output measures. These quantitative indicators are called "quality results" and reported by the hospitals. The raw quality scores generally range from 0 to 100. We can distinguish three subgroups of quality indicators: (i) Input (or process) quality indicators for which a high score indicates good quality, (ii) output quality indicators for which a high score indicates good quality, and (iii) output quality indicators for which a low score indicates good quality.

<INSERT TABLE 1 HERE>

The BQS does not recommend rankings of the hospitals based on reported quality results. It argues for instance that when results in a given service area are very close to each other for two hospitals, the difference might just be random and might not be due to difference in quality. According to the BQS, it is therefore important that the quality results are examined in more detail. These reported quality results are thus benchmarked according to a reference range in a process named "structured dialogue", which constitutes the main touchstone of the BQS procedure when evaluating the quality of hospitals. This investigation is carried out by independent experts in relevant fields. In this process, it is determined, for instance, whether the results are extraordinarily low and hence the quality requirements are not met and whether there are legitimate reasons for this. One such reason might be that the data has been

[29] In addition to the hospital level data, each standardized report also contains within hospital information at the department level, such as the number of cases in each 4-digit ICD-10 diagnosis, which we do not use in the current paper. There is however no quality information at the department level.

[30] Although 28 quality indicators are in theory available, we had to discard 9 of them for different reasons: a) they were not reported in 2008 (2 cases) b) there were only a few observations (2 cases) c) the standardization was different between 2006 and 2008 (5 cases).

misreported even though the treatment was performed accurately. Alternatively, the structured dialogue might show that there have been a number of unavoidable complications, which deflated the relevant quality score. Finally, if the structured dialogue indicates that the quality of treatment can be improved, then the hospital agrees to meet targets.

Hence, for each indicator two measures are available in the standardized reports: a quantitative one (the so-called quality result) and a qualitative one (the so-called quality evaluation). However, as it is possible to see from the description of the structured dialogue evaluations in Table 2, they do not allow an ordinal ranking of outcomes and, therefore, it is difficult to operationalize them in the econometric estimation. Even though some evaluations refer to good quality such as 6 (*"Result is positively peculiar after check, i.e. extraordinarily good"*), 8 (*"Result is not peculiar; no structured dialogue necessary"*) and 1 (*"Result is unpeculiar after check"*), and some evaluations point to a lower quality such as 3 (*"Result is for the first time qualitatively peculiar"*) and 4 (*"Result is repeatedly qualitatively peculiar"*), there are also other evaluations that provide feedback on non-quality aspects. For instance, evaluations 13 (*"After completing the structured dialogue, the results are qualitatively peculiar because of errors in the documentation"*) and 14 (*"After completing the structured dialogue, the results are repeatedly qualitatively peculiar because of errors in the documentation"*) indicate that there are errors in the documentation, while some others such as 5 read that the hospital refused to make any statement.

<INSERT TABLE 2 HERE>

In the current paper we thus rely primarily on the quantitative measures reported by the hospitals, i.e. the so-called quality results. We use however information from the structured dialogue to check the robustness of the results we find using quantitative indicators.

4. THE EMPIRICAL STRATEGY

The aim of our empirical analysis is firstly to check whether hospital quality has increased following the publication of quality measures reported in the 2006 wave of the survey.

We thus start by estimating the following linear regression for each quality indicator *j*:

$$Z_{ijt} = c + \beta_1 \text{YEAR 08}_{it} + \varepsilon_{it}$$

[1]

where Z_{ijt} is the quality score for hospital i in year *t*; ε is the normally distributed unobserved error term, *YEAR 200*8 is a dummy variable equal to 1 if the year is 2008, α_i are hospital specific fixed effects aiming to capture the different starting levels of quality in 2006 and β is the regression parameter of interest, which measures whether there has been a change in the clinical quality across the two waves. For quality indicators for which a high value means higher quality, we would expect β to be positive and significant if quality has improved after the publication of the 2006 quality reports. We would expect instead β to be negative and significant for quality indicators for which a high value means low quality,

We then proceed by checking whether there has been a differential change depending on the hospital's organizational form by estimating the following fixed effects linear regression, again for each quality indicator *j* and each hospital *i*:

$$Z_{ijt} = \alpha_i + \gamma_1 \text{YEAR 08}_{it} + \gamma_2 \text{PUBLIC}_{it} + \gamma_3 \text{PRIVATE}_{it} + \gamma_4 (\text{PUBLIC} * \text{YEAR 08})_{\text{it}} + \gamma_5 (\text{PRIVATE} * \text{YEAR 08})_{\text{it}} + \upsilon_{it}$$

[2]

where υ is the normally distributed unobserved error term, *PUBLIC* is a dummy variable that is equal to 1 if the hospital is a public hospital, *PRIVATE* indicates that the hospital is a private for-profit hospital and the benchmark is the nonprofit organizational form. Here the parameters of interest are γ_1, γ_4 and γ_5.

Furthermore, some hospitals are affiliated with medical schools or universities, and may even be owned by a university. These hospitals are teaching hospitals and provide clinical education and training to future health professionals. Some of these hospitals also have research centers for innovative, experimental and technologically advanced services. We thus check whether there has been a differential change in quality depending on the hospital's academic status by estimating the following simple linear regression, again for each quality indicator *j*:

$$Z_{ijt} = \alpha_i + \theta_1 \text{YEAR 08}_{it} + \theta_2 (\text{ACADEMIC} * \text{YEAR 08})_{\text{it}} + u_{it}$$

[3]

where *u* is the normally distributed unobserved error term and *ACADEMIC* is a dummy variable which takes the value 1 if the hospital is affiliated with a medical school or university. Here the parameters of interest are θ_1 and θ_2.

We also estimate the following equation to check whether there has been a differential change depending on the hospital's size:

$$Z_{ijt} = \alpha_i + \delta_1 \text{YEAR 08}_{it} + \delta_2 \text{SIZE 06}_{it} + \delta_3 (\text{SIZE06} * \text{YEAR 08})_{\text{it}} + e_{it}$$

[4]

where *e* is the normally distributed unobserved error term, *SIZE 06* is the number of beds, the number of doctors, the number of specialists or the number of doctors in year 2006, and δ_1, δ_2 and δ_3 are the parameters of interest.

Finally, we restrict our attention to the hospitals providing care in the obstetrics field and examine whether competitive pressure affects the change in quality due to quality disclosure. In order to proxy for competition, we use the number of hospitals providing care in obstetrics within a given radius. To investigate whether the choice of the radius influences the estimation results, we estimate models with 6 different radiuses (5, 10, 15, 20, 25, and 30). We also allow for the impact of competition on the quality differential to change depending on the initial level of quality. More formally, we estimate the following specification:

$$Z_{ijt}^{obstetrics} = \lambda_0 + \lambda_1 \text{YEAR 08}_{\text{t}} + \lambda_2 (\text{NUMBER OF HOSPITALS IN A CERTAIN RADIUS} * \text{YEAR 08})_{\text{it}} + \lambda_3 (\text{NUMBER OF HOSPITALS IN A CERTAIN RADIUS} * \text{YEAR 08} * Z_{ij2006}^{obstetrics})_{\text{ijt}} + \xi_{\text{it}}$$

[5]

where ξ is the normally distributed unobserved error term, *NUMBER OF HOSPITALS IN A CERTAIN RADIUS* is the number of hospitals providing care in obstetrics within a radius of 5, 10, 15, 20, 25, and 30 km's, $Z_{ij2006}^{obstetrics}$ represents the quality scores of the three quality indicators in obstetrics field (GEBH (737), GEBH (49523), GEBH (82913)) in 2006 to take into account the starting level of quality, and λ_1, λ_2 and λ_3 are the parameters of interest. We allow here for a differential effect of competition on the quality change depending on the initial level of quality in 2006. This is because if higher competition is correlated with higher

quality, then in more competitive markets initial quality is higher and there is less room for quality to improve following quality disclosure.[31]

The definitions and the summary statistics for the variables used in the estimation of equations (1), (2), (3), (4), and (5) are displayed in Table 3. A quick scan of the summary statistics shows that the great majority of hospitals in the dataset are either public or non-profit hospitals. Besides 30 percent of hospitals in our sample are universities or teaching hospitals.

<INSERT TABLE 3 HERE>

Having introduced the data and empirical strategy, we now discuss some econometric issues. A potential problem with quality indicators is that the quality might not be accurately measured due to the possibility of selective reporting by hospitals. That is, the hospitals might omit reporting cases which could decrease the quality scores. Given that hospitals must report no less than 80 percent of cases to avoid financial penalties, the remaining 20 percent in theory would offer discretion to hospitals to select the cases to report. If the hospitals underreported the cases systematically, this would introduce a measurement error on quality in our model.

The dataset includes an additional variable, the so-called documentation rate, which measures the number of cases over all cases reported by a hospital when constructing the quality results. We thus examine the documentation rates for each service area to check whether there is room for, and evidence of, strategic reporting. The documentation rates in service areas across years can be found in Table 4. Except the service area of Coronary Angiography and Percutaneous Coronary Intervention (PCI), the documentation rates for service areas are on average above 90 percent. Selection can thus at most affect 10% of the cases, not 20%. In addition, as shown in Table 4a, most average documentation rates increased from 2006 to 2008. Finally, a regression of the documentation rates for the different areas yields in general insignificant or positive significant estimates for the coefficient for a year dummy for 2008.[32]

[31] Indeed, if we do not control for the initial level of quality, we find a negative relationship between competition and the change in quality.
[32] We conduct further robustness checks for selective reporting in Section 5.

Only in two clinical areas ("Cholecystectomy" and "Breast Surgery") the documentation rates appear to have slightly declined.

<INSERT TABLE 4 HERE>

More generally, being the quality results self-reported by hospitals, one might wonder whether some hospitals manipulate their reports rather than underreporting. We believe the presence of the structured dialogue per se discourages such a behavior. In addition the results of the structured dialogue itself can be exploited to check for the possibility of underreporting. Indeed, evaluations of 13 and 14 in the structured dialogue indicate that there are errors in the documentation. When we look at the structured dialogue evaluations for the various quality indicators, we find that, as shown in Table 5, the average percentage of hospitals with documentation errors does not even reach 1 % in most of the service areas.[33]

<INSERT TABLE 5 HERE>

Overall, even though we recognize that in theory there might be potential problems due to underreporting or misreporting, we believe that this is not likely to be the case in practice and therefore will not affect our estimates in a considerable way.

5. THE EMPIRICAL FINDINGS

This section reports the results of the estimation and answers the main research question: whether clinical quality in various service areas increased in German hospitals following the publication of their quality scores. First, we discuss separately results for process measures of quality and output measures of quality. We then show results on whether hospital's characteristics, such as the different types of organizational form, having an academic status or size, affect the change in quality from 2006 to 2008. We also perform some robustness checks. Finally, we report results on the relationship between competitive pressure faced by a hospital and the change in its quality following quality disclosure.

5.1 Quality Change in Input (Process) Measures

[33] We conduct further robustness checks for misreporting in Section 5.

Table 6 presents the estimates of the coefficient of equation (1) for input or process measures for which higher scores imply better quality. The last column reports results for all the hospitals for which a given quality measure is available. The first four columns report instead the results for hospitals in different quartiles of initial performance, with the hospitals in the first quartile being those which performed relatively worst and the hospitals in the fourth quartile being those which performed relatively better.

In all regressions, except the one in which the dependent variable is CHOL (44800) ("*collection of histological findings in cases of cholecystectomy"*), we estimated a statistically significant positive coefficients on *YEAR 2008* implying that the quality scores for process measures across waves have increased. As to the quality differentials across hospitals in different quartiles of initial performance, the results indicate that the variable *YEAR 2008* is significant in most of the estimated regression equations.[34] More interestingly, the results further suggest that the hospitals in the first quartile increased their clinical quality relatively more compared to the hospitals in the remaining quartiles. Likewise, the hospitals in the second quartile have increased their quality results for process measures more compared to the hospitals in the third and fourth quartiles.

<INSERT TABLE 6 HERE>

5.2 Quality Change in Output Measures

Table 7 presents estimates of the coefficients of equation (1) for outcome measures of quality. Again results are displayed separately for each quartile, in the first four columns) and for the whole sample (in the last column). When running the regression on the whole sample, the coefficient on the year dummy *YEAR 2008* points to a statistically significant quality increase for five out of twelve outcome quality measures, which are KORO_PCI (69891) [35] ("*achieving the main objective of percutaneous coronary intervention"*), KORO_PCI (69889) ("*proportion of percutaneous coronary intervention in patients without acute coronary syndrome*"), HUFT_TEP (45059) ("*re-operations or re-interventions due to complications following hip endoprosthesis*"), HUFT_TEP (45108) ("*postoperative wound infection*"), and KNIE_TEP (45059) ("*re-operations or re-interventions due to complications following total*

[34] In some cases, two quartiles of initial performance correspond to the same value. As such these observations cannot be distinguished when running a regression.
[35] A high score indicates better quality for this outcome variable whereas a low score indicates better quality for the remaining variables.

knee endoprosthesis"). However, for the remaining quality indicators the coefficient on the dummy variable *YEAR 2008* is mostly negative and insignificant.

Nonetheless, looking at the results of the estimation of equation (1) for the single quartiles, the coefficients on *YEAR 2008* are generally statistically significant. The results on outcome measures indicate that the hospitals in the first quartile have increased their clinical quality relatively more compared to the hospitals in the remaining quartiles, with hospitals in the higher quartile having in fact witnessed a decline in quality. Hence the insignificant coefficient estimated for seven out of twelve outcome quality measures when considering all hospitals would seem the result of a composition effect. Such an effect might be due to simple mean reversal, which together with the previous findings would suggest that the random component in the "production process" of quality is possibly more important for output quality measures than the inputs. Alternatively, the effect might also be due to an increase in the number of patients with severe diagnosis having opted in 2008 for the best performing hospitals in 2006. We discuss this further in Section 5.5.

<INSERT TABLE 7 HERE>

5.3 Quality Change across Organizational Forms, Teaching Status and Size

Tables 8, 9, 10 and 11 display the results of the estimation of equations (2) and (3) which allow for a differential change in quality indicators across organizational forms and between hospitals with and without academic status, for both process and outcome measures of quality. The results suggest that organizational form and academic status did not matter systematically for quality differentials, as the interaction term is generally estimated to be statistically insignificant in the estimation equation, i.e. the effect of being a private for profit or public for profit hospitals. In addition, it is not possible to reject the null hypothesis that the coefficients on *PUBLIC * YEAR 08* and *PRIVATE * YEAR 08* are equal to each other.

Finally, Tables 12 and 13 show the results of the estimation of equation (4). As can be seen from the tables, quality differentials do not seem to be systematically related to size, as the coefficient on BEDS 06 * YEAR 08 is mostly insignificant. This result suggests that hospital size[36] -proxied by number of beds- does not matter in determining quality differentials.

[36] We have also used number of doctors, specialists, inpatients or outpatients as proxies for size. The estimation results, which we do not report here, do not change in a considerable way.

<INSERT TABLE 8,9,10, 11, 12, 13 HERE>

5.4 Quality Change and Competition

Table 14 displays the results of the estimation of equation (5). Here we use three different quality indicators in obstetrics field: Presence of pediatrician in cases of premature infants (GEBH (737)), prenatal corticosteroid therapy (GEBH (49523)), and E-E-time in emergency cases of caesarean (GEBH (82913)). The importance of the first quality indicator arises from the fact that premature infants could be better treated by a pediatrician. Furthermore, prenatal corticosteroid therapy decreases morbidity and mortality in premature newborns by decreasing the likelihood of respiratory disease and dependence on mechanical respiratory support. This treatment is commonly recommended for women at risk for premature delivery between 24 weeks and 33 weeks of gestation. Finally, the E-E time is the time lag between the moment at which the decision for an emergency caesarean section is taken and the birth of the child. The lower the E-E-time the lower the risk for permanent damage to the child. Rates of E-E-time over 20 minutes indicate organizational problems.

As reported in Table 14, in all regressions, we find a significant positive impact of competition on all clinical quality differentials in obstetrics: the coefficient on *NR OF HOSPITALS IN A CERTAIN RADIUS * YEAR 08* is always positive and statistically significant at 1 % significance level.[37] Furthermore, the magnitude of the effect of competition on the quality differential in obstetrics field is decreased once the radius is widened. The latter result is consistent with nearer competitors exerting more competitive pressure than further ones. Indeed, Gaynor et al. (2011) estimated a structural model of demand for heart bypass surgery (CABG) in England to evaluate the effect of the reform of the English National Health Service, which, *inter alia,* required referring physicians to give patients choice of hospitals. Gaynor et al. (2011) found that not only the demand elasticity with respect to a hospital's (risk-adjusted) mortality rate was greater after the reform than before, but also find that cross-elasticities between hospitals with respect to their mortality rates fall dramatically with distance, indicating that close by hospitals compete with each other over quality, but not with hospitals far away.

[37] We do not instrument for competitive pressure here. In fact, we use as a measure the number of competitors in a given radius in 2006, which is predetermined with respect to the quality change between 2006 and 2008. Hence, endogeneity should not be an issue, differently from studies regressing quality on competitive pressure. See Gaynor and Town (2011) for a discussion.

<INSERT TABLE 14 HERE>

5.5 Robustness Checks

We here report results of robustness checks conducted in order to assess whether results are driven by selective reporting or manipulation of the data by the hospitals which report the data.

First, in order to test whether our results are driven by selective reporting, in addition to the preliminary analysis reported in Tables 4a and 4b, we ran again all the regressions in Table 6 and 7 after having dropped observations relating to hospitals whose documentation rate for the service area corresponding to the considered quality indicator declined. Results are reported in Tables 15 and 16. They show that the findings discussed above are robust. In particular, the coefficient on *YEAR 08* turns negative and insignificant in the regression where the dependent variable is HSM_IMPL (11265) *("Peri-operative complications: Catheter dislocation in ventricle"*) in Table 7, and the estimated change in the output quality indicator HSM_IMPL (11255) (*"Peri-operative complications: surgical complications")* in Table 7 becomes significant.

<INSERT TABLES 15 AND 16 HERE>

Second, in order to test whether our results are driven by misreporting, in addition to the preliminary analysis reported in Tables 5a and 5b, we ran again all the regressions in Table 6 and 7 after having dropped observations relating to hospitals whose evaluation result for the considered quality indicator was either 13 (*"After completing the structured dialogue, the results are qualitatively peculiar because of errors in the documentation"*) or 14 (*"After completing the structured dialogue, the results are repeatedly qualitatively peculiar because of errors in the documentation"*). Results are reported in Tables 17 and 18. Once again the results discussed in the previous sections appear robust.

<INSERT TABLES 17 AND 18 HERE>

5.6 Quality change and the share of cases

We now investigate whether the share of cases treated in the 2006 best performing hospitals has increased in 2008 with respect to 2006 and whether, conversely, the share of cases treated in the 2006 worst performing hospitals has declines. If so, there would be evidence that patients (or their referring physicians) respond to quality. We first construct market shares for a hospital by dividing the number of cases handled in that hospital in each of the 9 service areas by the total number of cases handled in all hospitals in that service area. Finally, we divide hospitals in quartiles based on their 2006 quality score and estimate the following specification for each quartile of 2006 quality of the corresponding quality indicator:

$$S_{ijt} = \kappa_i + \lambda_1 \text{YEAR } 08_{it} + \omega_{ijt} \qquad \textbf{[6]}$$

where S_{ijt} is the market share of hospital *i* in year *t* for the treatment area *j*; ω is the normally distributed unobserved error term, *YEAR 2008* is a dummy variable equal to 1 if the year is 2008 and λ_1 is the regression parameter of interest.

<INSERT TABLES 19 AND 20 HERE>

Tables 19 and 20 display the estimation results of equation [6]. The estimation results for process measures in Table 19 indicate that the market shares did not change significantly for the hospitals in all quartiles of 2006 quality, except for the quality indicator "*Indication for coronary angiography: Ischemia symptoms*" (*KORO_PCI (43757)*). On the other hand, as shown in Table 20, the market shares of the best performing hospitals in 2006 significantly increased for 6 out of 12 outcome measures. For 5 of the remaining 6, the increase was still positive but statistically insignificant. This would seem to suggest that patients (or their physicians) react to output quality measures (but not to input quality measures)[38]. It also suggests that the decline in quality for the 2006 best performing hospitals may indeed be due, at least in part, to a relative increase in the number of patients and probably to an increase in the average severity of the patients rather than simply being due to mean reversion. [39]

[38] A caveat is however necessary in interpreting the results. The number of cases on which the hospitals "fictitious" market shares are calculated refers to the service area. More than one quality measure is available for each quality area. Thus, not all quality measures of a given service area may be relevant for all cases in that service area.

[39] A better test would have been to check whether the average severity of the patients/cases for which a given quality indicator is relevant increased in 2008 with respect 2006 for the best performing hospitals. We lack, however, data on severity of patients/cases and, as mentioned above, also a mapping of cases to quality indicators.

6. CONCLUSION

The main purpose of the current study was to test whether clinical quality in hospitals increases with the publication of quality results by an external authority. In fact, such a question is crucial for the current debate on the reform of health care systems in many European countries. An example is the debate around the UK government white-paper on "Equity and excellence: Liberating the NHS" published in 2010.

We conducted our analysis using data obtained from the Federal Office for Quality Assurance in Germany. Since 2005, quality disclosure by hospitals in standardized format is mandatory in Germany by law every two years. The Federal Office for Quality Assurance is in charge of defining the indicators to be reported and to decide which quality indicators to disclose to the public. The standardized reports that include the latter indicators are available online and a number of dedicated websites exist which enable the public to search for information on quality by hospital or location.

We used data on 24 different public quality indicators for 9 different service areas for German hospitals for the years 2006 and 2008. Compared to most other studies, we thus employed a much higher number of indicators for a larger number of service areas. Also, to the best of our knowledge, we were the first in the empirical economic literature to use these data.

Our estimates indicate that clinical quality measured by process indicators has increased significantly in 2008 compared to 2006, suggesting that quality is indeed the strategic variable on which competition takes place in the hospital market.

We have also examined whether the increase in quality differed across hospitals with a different initial performance in terms of quality in 2006. The results on both process and outcome measures suggest that the underperforming hospitals in 2006 have been able to increase their clinical quality relatively more than other hospitals.

One reason explaining the increase in quality scores for process measures of clinical quality could be that, in order to sustain competition in the presence of gradually pervading selective contracting in Germany, hospitals might find it crucial to increase the quality that will be

displayed to the public. In other words, increased quality is a result of hospitals' perception that competition in the market takes place on quality. Lacking information on patients and costs, we cannot estimate the welfare effects of the observed quality change. As a result we cannot completely rule out the hypothesis of a medical arms' race having taken place. In fact, this would be an interesting topic for further research.

Although the quality differentials for outcome indicators are insignificant for approximately half of the quality measures when estimated using data on all hospitals, nonetheless, average clinical quality is estimated to have increased for underperforming hospitals and decreased for the best performing hospitals in 2006.

A possible explanation for the more pronounced increase in process measures compared to outcome measures might be that hospitals have more control over process quality rather than over outcome quality, since the latter is also affected by the patients' condition. The finding that quality measured by output indicators has increased for underperforming hospitals and decreased for the better performing ones may then be due to a simple mean reversal, if the assignment of patients' conditions to hospitals is mainly random, or to an increase in patients with higher severity diagnosis that chose better performing hospitals as a result of the publication of the quality reports.

As we do not have data on severity of patients, we could not rule out a case of simple mean reversion. However, we further showed that the share of cases for the best performing hospitals in terms of output measures increased in 2008 with respect to 2006, thus providing some evidence that patients (or their physicians) react to output quality measures and suggesting that the decline in output measures of quality for the 2006 best performing hospitals may indeed be due, at least in part, to a relative increase in the number of patients and to a corresponding increase in the average severity of the patients rather than simply being due to mean reversion.

Interestingly we find that the 2006 best performing hospitals in terms of input measures witnessed a generally insignificant increase in the share of cases in 2008 with respect to 2006. We argued that this might be due to the fact that patients (or their physicians) value more information on output measures of quality than on input measures of quality when choosing among hospitals.

Finally, we constrained our attention to the obstetrics field and estimated the impact of competition -proxied by the number of competitors in a certain radius- on quality differentials. Our estimation results suggest that there is a significant and positive effect of competition on quality differentials, meaning that higher competitive pressure leads to higher increases in quality following quality disclosure and thus providing additional evidence that competition takes place on quality. Lacking data on severity of patients' conditions, we cannot rule out that the positive effect of competition on the quality differential is due to hospitals facing more competitive pressure rejecting more patients with severe conditions, as discussed in Dranove et al (2003), an issue which is clearly of great policy relevance. Still our finding is not affected by whether the quality measure is a process or an output measure. This would seem to suggest that the main force is not the selection of cases by hospitals. If it were, we would expect the effect to be at play mainly, if not only, for outcome measures of quality.

All in all, since most of the previous work had focused on a few quality measures, often from nursing homes, we believe to have contributed to the literature and the debate on the impact of quality disclosure on quality supply in the health care market by providing evidence from a larger set of quality measures for the hospital market. Whereas our results may be interpreted as suggesting that quality disclosure increases quality supply in this market, reduces the differences in quality among hospitals and is more effective the more competition hospitals face, we were only able to provide only indirect, and arguably non-conclusive, evidence on the role played by patients in the process. Moving in that direction would require gathering information on the number of different diagnosis by hospitals, ranking them in terms of severity and mapping them to reported quality measures. We consider this an interesting direction for future research.

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TABLES AND FIGURES

Table 1a: Description of Quality Indicators and Summary Statistics

Service Area	Quality Indicator	Code	Explanation
Cholecystectomy	Collection of histological findings	CHOL (44800)	After removal, the gallbladder is sent for pathological examination under microscope to confirm the diagnosis and look for an incidental malignancy of the gall bladder.
	Re-intervention rate	CHOL (44927)	A re-intervention is another surgical or interventional procedure after surgery for postoperative complications. Typical reasons for re-intervention after cholecystectomy include bile duct injury, bleeding or inflammation. The rate of re-intervention, therefore, provides information on the incidence of serious early complications.
Obstetrics	Presence of pediatrician for premature infants	GEBH (737)	Premature infants should be treated by pediatricians, who are specialized physicians.
	Prenatal corticosteroid therapy: in case of births with a gestational age of 24+0-34+0 weeks (excluding stillbirths) and births with a prenatal hospital stay of at least two calendar days	GEBH (49523)	Prenatal corticosteroid therapy decreases morbidity and mortality in premature newborns by decreasing the likelihood of respiratory disease and dependence on mechanical respiratory support. This treatment is commonly recommended for women at risk for premature delivery between 24 weeks and 33 weeks of gestation.
	E-E-time in emergency caesarean cases	GEBH (82913)	The E-E time is the time lag between the moment at which the decision for an emergency caesarean section is taken and the birth of the child. The lower the E-E-time the lower the risk for permanent damage to the child. Rates of E-E-time over 20 minutes indicate organizational problems.
Gynecological Surgery	Antibiotic prophylaxis in hysterectomy cases	GYN_OP (47637)	A hysterectomy is the surgical removal of the uterus. Wound infections after hysterectomy lead to high physical and mental stress, and have direct and indirect costs. In a meta analysis, Mittendorf et al. (1993) argue that wound infections after hysterectomy can be reduced by about 12 % if treated via antibiotic prophylaxis, which is a measure taken to prevent infections using antibiotics.
	Thromboprophylaxis in hysterectomy cases	GYN_OP (50554)	Deep venous thrombosis (thromboembolism), which might be caused by a recent surgery, is a blood clot that forms in a vein deep inside a part of the body[40]. It is the most common preventable cause of death in surgical patients. Thromboprophylaxis, using mechanical methods to promote venous outflow from the legs and antithrombotic drugs, provides the most effective means of reducing morbidity and mortality in these patients[41].

[40] http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001209/
[41] http://www.ncbi.nlm.nih.gov/pubmed/12691354

Table 1b: Description of Quality Indicators and Summary Statistics

Service Area	Quality Indicator	Code	Explanation
Pacemaker Implantation	Guideline conformity: indication for bradydysrhythmia	HSM_IMPL (9962)	Bradydysrhythmia is the resting of heart rate of less than 60 minutes per minute, which means that the heart rate is abnormally slowed and a disturbance in the heart rhythm has occurred. A pacemaker is a medical device that uses electrical impulses to regulate the beating of the heart. The German Cardiac Society issued detailed guidelines on pacemaker implantation, which are decisive for the quality assurance in Germany, and this quality indicator shows whether the guidelines are adhered for indication in a bradydysrhythmia case.
	Guideline conformity: system choice in bradydysrhythmia cases	HSM_IMPL (75973)	There are various pacemaker systems depending on the underlying rhythm disorder. The German Cardiac Society's guidelines provide specific recommendations for the choice of system, and this quality indicator shows whether the guidelines are adhered.
	Peri-operative complications: Surgical complications	HSM_IMPL (11255)	This quality indicator indicates how frequent surgical complications occur following pacemaker implantation. These surgical complications include arrhythmias, perforations of blood vessels and heart muscle, embolism etc.
	Perioperative complications: Catheter dislocation in atrium	HSM_IMPL (11264)	This quality indicator indicates how frequent catheter dislocation in atrium occurs following pacemaker implantation.
	Perioperative complications: Catheter dislocation in ventricle	HSM_IMPL (11265)	This quality indicator indicates how frequent catheter dislocation in ventricle occurs following pacemaker implantation.
Hip Endoprosthesis: Initial Implantation	Endoprosthesis dislocation	HUFT-TEP (45013)	Endoprosthesis dislocation is a major complication after total hip endoprosthesis, and it is very stressful for the patient. It usually occurs within the first eight postoperative weeks. The dislocation requires a second surgery, and this surgery affects patients with weakened abductor muscles or neuromuscular deficits.
	Postoperative wound infection	HUFT-TEP (45108)	Postoperative wound infection is an infection in the operative area. This quality indicator indicates how frequent postoperative wound infection is following hip endoprosthesis surgery.
	Reoperations (or re-interventions) due to complications	HUFT-TEP (45059)	Unplanned re-operations are due to complications following the primary surgery. The overall rate of secondary procedures is an indication of the quality of a hospital.

Table 1c: Description of Quality Indicators and Summary Statistics

Service Area	Quality Indicator	Code	Explanation
Carotid Reconstruction	Indication for asymptomatic carotid stenosis	KAROT (9556)	Carotid stenosis means narrowing or constriction of the inner surface of the carotid artery. Carotid endarterectomy is a surgical procedure to correct stenosis. However, in deciding to perform the surgery, it is important to follow the proven indications in treating people with asymptomatic carotid stenosis. These proven indications are summarized in a paper by American Heart Association (Biller et al. 1998).
	Peri-operative stroke or death in risk-adjusted logistical carotid - Score I	KAROT (68415)	It is likely that patients suffering from carotid stenosis have a stroke. Studies show that the risk of stroke or death is decreased for patients who undergo surgical treatment. However, even though peri-operative stroke or death is in part influenced by the quality of treatment in a hospital, patient-related factors such as age, severity of stenosis etc. are also important. For a fair comparison of hospitals, the consideration of different risk profiles of patients is required. Thus, a risk-adjusted rate of "peri-operative stroke or death" is calculated using logistic regression.
Total Knee Endoprosthesis: Initial implantation	Postoperative wound infection	KNIE_TEP (47390)	Postoperative wound infection is an infection in the operative area. This quality indicator indicates how frequent postoperative wound infection is following total knee endoprosthesis surgery.
	Reoperations (or re-interventions) due to complications	KNIE_TEP (45059)	Unplanned re-operations are due to complications following the primary surgery. The overall rate of secondary procedures is an indication of the quality of a hospital.

Table 1d: Description of Quality Indicators and Summary Statistics

Service Area	Quality Indicator	Code	Explanation
Coronary Angiography and Percutaneous Coronary Intervention (PCI)	Indication for coronary angiography: Ischemia symptoms	KORO_PCI (43757)	This quality indicator shows the percentage occurrence of coronary angiography for patients with ischemia symptoms.
	Proportion of PCI in patients without acute coronary syndrome	KORO_PCI (69889)	The cardiological societies regularly publish updated guidelines on the indications for coronary intervention (American Heart Association, American College of Cardiology, Society for Cardiovascular Angiography and Interventions, European Society of Cardiology). This quality indicator refers to the percentage of cases in which the guidelines are not followed for indications for patients without acute coronary syndrome.
	Achieving the main objective of percutaneous coronary intervention	KORO_PCI (69891)	Percutaneous Coronary Intervention (PCI) is a therapeutic procedure to open narrowed or blocked coronary arteries. The main objective of intervention in PCI is defined as "having an angiographic change of 50 % in dilated segments".
Breast Surgery	Hormone receptor analysis	MAMMA (46201)	Receptor analysis is a diagnostic test to determine biological characteristics of cells in a tumor and their responses to growth factors. In breast cancer cases, this analysis require a technique called immunocytochemistry, and the outcome of this test is used to decide whether a woman with breast cancer should be treated with anti-estrogens.
	Documentation of margins of resection	MAMMA (68100)	"Margins of resection" is the distance between a tumor and the edge of the surrounding tissue removed along with it. When a breast tumor is removed, some tissue surrounding it is also removed. A pathologist then checks the tissue under a microscope to see if the margins are free of cancer cells. Knowing the closeness of cancer cells to the edge of the removed tissue helps in determining the right treatment decision (e.g., whether additional surgery is needed).

Table 1e: Description of Quality Indicators and Summary Statistics

Service Area	Quality Indicator	Code	Input or Output Measure	High Score Meaning	Obs.	Mean	Std. Dev.
Cholecystectomy	Collection of histological findings	CHOL (44800)	INPUT	HIGH QUALITY	2238	98.62	5.92
	Re-intervention rate	CHOL (44927)	OUTPUT	LOW QUALITY	2191	1.16	3.40
Obstetrics	Presence of pediatrician for premature infants	GEBH (737)	INPUT	HIGH QUALITY	1307	67.22	39.46
	Prenatal corticosteroid therapy: in case of births with a gestational age of 24+0-34+0 weeks (excluding stillbirths) and births with a prenatal hospital stay of at least two calendar days	GEBH (49523)	INPUT	HIGH QUALITY	798	69.39	39.57
	E-E-time in emergency caesarean cases	GEBH (82913)	INPUT	HIGH QUALITY	1390	92.50	20.87
Gynecological Surgery	Antibiotic prophylaxis in hysterectomy cases	GYN_OP (47637)	INPUT	HIGH QUALITY	1802	91.10	17.99
	Thromboprophylaxis in hysterectomy cases	GYN_OP (50554)	INPUT	HIGH QUALITY	1838	98.13	9.75
Pacemaker Implantation	Guideline conformity indication for bradydysrhythmia	HSM_IMPL (9962)	INPUT	HIGH QUALITY	1778	92.10	11.61
	Guideline conformity system choice in bradydysrhythmia cases	HSM_IMPL (75973)	INPUT	HIGH QUALITY	1817	92.93	10.58
	Peri-operative complications: Surgical complications	HSM_IMPL (11255)	OUTPUT	LOW QUALITY	1855	1.30	3.46
	Perioperative complications: Catheter dislocation in atrium	HSM_IMPL (11264)	OUTPUT	LOW QUALITY	1852	2.07	4.25
	Perioperative complications: Catheter dislocation in ventricle	HSM_IMPL (11265)	OUTPUT	LOW QUALITY	1885	1.46	3.13

Table 1f: Description of Quality Indicators and Summary Statistics (Continued)

Service Area	Quality Indicator	Code	Input or Output Measure	High Score Meaning	Obs.	Mean	Std. Dev.
Hip Endoprosthesis: Initial Implantation	Endoprosthesis dislocation	HUFT-TEP (45013)	OUTPUT	LOW QUALITY	2167	1.02	5.11
	Postoperative wound infection	HUFT-TEP (45108)	OUTPUT	LOW QUALITY	2160	1.13	4.23
	Reoperations (or re-interventions) due to complications	HUFT-TEP (45059)	OUTPUT	LOW QUALITY	1878	1.91	3.90
Carotid Reconstruction	Indication for asymptomatic carotid stenosis	KAROT (9556)	INPUT	HIGH QUALITY	917	89.98	18.00
	Peri-operative stroke or death in risk-adjusted logistical carotid - Score I	KAROT (68415)	OUTPUT	LOW QUALITY	915	2.96	6.66
Total Knee Endoprosthesis: Initial implantation	Postoperative wound infection	KNIE_TEP (47390)	OUTPUT	LOW QUALITY	1878	0.68	3.54
	Reoperations (or re-interventions) due to complications	KNIE_TEP (45059)	OUTPUT	LOW QUALITY	2156	3.03	6.21
Coronary Angiography and Percutaneous Coronary Intervention (PCI)	Indication for coronary angiography: Ischemia symptoms	KORO_PCI (43757)	INPUT	HIGH QUALITY	1302	90.77	12.61
	Proportion of PCI in patients without acute coronary syndrome	KORO_PCI (69889)	OUTPUT	LOW QUALITY	1009	4.71	11.06
	Achieving the main objective of percutaneous coronary intervention	KORO_PCI (69891)	OUTPUT	HIGH QUALITY	993	88.07	23.81
Breast Surgery	Hormone receptor analysis	MAMMA (46201)	INPUT	HIGH QUALITY	1751	93.53	18.67
	Documentation of margins of resection	MAMMA (68100)	INPUT	HIGH QUALITY	1623	83.48	26.43

Table 2: Evaluation by Structured Dialogue

Evaluation by structured dialogue	Explanation
0	It is currently impossible to state whether result is peculiar, or not, because the structured dialogue is not completed yet.
1	Result is “unpeculiar” after check.
2	Result is “unpeculiar” for this year. However, results should be checked again in the next report.
3	Result is for the first time “qualitatively peculiar” (potentially despite a certain justification).
4	Result is repeatedly “qualitatively peculiar” (potentially despite a certain justification).
5	Result is peculiar because the hospital refused to make any statement.
6	Result is positively peculiar after check, i.e. extraordinarily good.
8	Result is not peculiar; no structured dialogue necessary.
9	Miscellaneous
13	After completing the structured dialogue, the results are qualitatively peculiar because of errors in the documentation.
14	After completing the structured dialogue, the results are repeatedly qualitatively peculiar because of errors in the documentation.

Table 3a: Description of Explanatory Variables and Summary Statistics

Variable	Definition	Obs.	Mean	Std. Dev.
YEAR 2008	This variable is equal to 1 if year is 2008, 0 otherwise.	3878	0.500	0.500
Ownership Status				
PUBLIC	This variable is equal to 1 if hospital is a public hospital, 0 otherwise.	3870	0.325	0.468
PRIVATE	This variable is equal to 1 if hospital is a private hospital, 0 otherwise.	3870	0.247	0.431
NONPROFIT	This variable is equal to 1 if hospital is a nonprofit hospital, 0 otherwise.	3870	0.428	0.495
Academic Status				
ACADEMIC	This variable is equal to 1 if hospital is a teaching hospital, 0 otherwise.	3878	0.302	0.459
Size				
BEDS	This variable is equal to the number of beds divided by 100.	3679	2.724	3.118
DOCTORS	This variable is equal to the number of doctors divided by 100.	3528	0.877	4.621
SPECIALISTS	This variable is equal to the number of specialists divided by 100.	3535	0.475	2.689
Geographic Location				
CLOSEST_HOSP	This variable is equal to the distance to the closest hospital (in kilometers) providing care in obstetrics.	1832	15.373	10.857
NR_HOSP_5_KM	This variable is equal to the number of hospitals providing care in obstetrics in 5 km radius.	1832	1.319	0.710
NR_HOSP_10_KM	This variable is equal to the number of hospitals providing care in obstetrics in 10 km radius.	1832	1.945	1.685
NR_HOSP_15_KM	This variable is equal to the number of hospitals providing care in obstetrics in 15 km radius.	1832	2.668	2.577
NR_HOSP_20_KM	This variable is equal to the number of hospitals providing care in obstetrics in 20 km radius.	1832	3.803	3.730
NR_HOSP_25_KM	This variable is equal to the number of hospitals providing care in obstetrics in 25 km radius.	1832	5.236	4.926
NR_HOSP_30_KM	This variable is equal to the number of hospitals providing care in obstetrics in 30 km radius.	1832	6.945	6.306

Table 3b: Description of Explanatory Variables and Summary Statistics

Variable	Definition	Obs.	Mean	Std. Dev.
Quality Indicators in Obstetrics Field				
GEBH (737) 06	Quality score for presence of pediatrician in cases of premature infants in 2006 for a given hospital	1298	64.948	39.130
GEBH (49523) 06	Quality score for prenatal corticosteroid therapy in 2006 for a given hospital	930	55.668	42.819
GEBH (82913) 06	Quality score for E-E-time in emergency caesarean cases in 2006 for a given hospital	1462	89.340	25.833
Number of Cases in Various Service Areas				
CHOL CASES	This variable is equal to the number of cases in cholecystectomy in a hospital in a given year.	2276	147.362	83.855
GEBH CASES	This variable is equal to the number of cases in obstetrics in a hospital in a given year.	1672	754.892	525.404
GYN_OP CASES	This variable is equal to the number of cases in gynecological surgery in a hospital in a given year.	1953	340.747	2266.593
HSM_IMPL CASES	This variable is equal to the number of cases in pacemaker implantation in a hospital in a given year.	1801	71.949	60.535
HUFT-TEP CASES	This variable is equal to the number of cases in hip endoprosthesis in a hospital in a given year.	2014	147.684	160.022
KAROT CASES	This variable is equal to the number of cases in carotid reconstruction in a hospital in a given year.	777	64.184	69.519
KNIE_TEP CASES	This variable is equal to the number of cases in total knee endoprosthesis in a hospital in a given year.	1832	145.331	128.248
KORO_PCI CASES	This variable is equal to the number of cases in coronary angiography and percutaneous coronary intervention in a hospital in a given year.	1288	966.416	1186.288
MAMMA CASES	This variable is equal to the number of cases in breast surgery in a hospital in a given year.	1553	141.242	148.283

Table 4a: Documentation Rates in Service Areas across Years

Documentation Rates in Service Areas	Obs.	Mean	Std. Dev.	Min	Max
2006					
Cholecystectomy	1217	97.32	11.68	0	100
Obstetrics	897	96.96	14.82	0	100
Gynecological Surgery	1140	94.38	17.78	0	100
Pacemaker Implantation	1019	95.28	15.06	0	100
Hip Endoprosthesis	1168	96.21	14.97	0	100
Carotid Reconstruction	527	90.46	25.23	0	100
Total Knee Endoprosthesis	1000	96.40	15.65	0	100
Breast Surgery	1072	92.09	20.51	0	100
Coronary Angiography and Percutaneous Coronary Intervention (PCI)	742	87.90	28.25	0	100
2008					
Cholecystectomy	1151	96.83	12.11	0	100
Obstetrics	814	98.30	9.60	0	100
Gynecological Surgery	1114	94.02	19.39	0	100
Pacemaker Implantation	1006	94.54	17.04	0	100
Hip Endoprosthesis	1105	97.68	8.68	0	100
Carotid Reconstruction	530	93.88	19.14	0	100
Total Knee Endoprosthesis	973	97.74	10.07	0	100
Breast Surgery	1015	89.88	22.96	0	100
Coronary Angiography and Percutaneous Coronary Intervention (PCI)	854	85.42	32.05	0	100

Table 4b: Change in documentation rates across waves by clinical area

	Cholecystectomy	Obstetrics	Gynecological Surgery	Pacemaker Implantation	Hip Endoprosthesis	Carotid Reconstruction	Total Knee Endoprosthesis	Breast Surgery	Coronary Angiography and PCI
YEAR 08	-0.6797*	0.3527	0.6285	-0.2224	0.7590*	1.0749	0.3443	-2.0094***	2.2771**
	(0.364)	(0.356)	(0.554)	(0.525)	(0.411)	(0.938)	(0.493)	(0.721)	(0.894)
CONSTANT	97.4116***	97.4274***	93.8940***	95.0209***	96.5556***	91.6335***	96.8906***	91.9898***	85.3517***
	(0.177)	(0.169)	(0.274)	(0.261)	(0.200)	(0.471)	(0.243)	(0.351)	(0.478)
Observations	2,368	1,711	2,254	2,025	2,273	1,057	1,973	2,087	1,596

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 5: Average Percentage of Hospitals with Documentation Errors in Various Service Areas in 2008

Variable	Obs.	Mean	Std. Dev.
CHOL (44800)	1142	0.006	0.078
CHOL (44927)	1138	0.007	0.084
GEBH (737)	808	0.026	0.159
GEBH (49523)	808	0.033	0.159
GEBH (82913)	808	0.009	0.093
GYN_OP (47637)	1080	0.016	0.125
GYN_OP (50554)	1079	0.006	0.074
HSM_IMPL (11255)	992	0.000	0.000
HSM_IMPL (11264)	992	0.002	0.045
HSM_IMPL (11265)	992	0.001	0.032
HSM_IMPL (75973)	992	0.010	0.100
HSM_IMPL (9962)	992	0.014	0.118
HUFT-TEP (45013)	1104	0.000	0.000
HUFT-TEP (45059)	1104	0.001	0.030
HUFT-TEP (45108)	1104	0.003	0.052
KAROT (9556)	515	0.017	0.131
KAROT (68415)	519	0.006	0.076
KNIE_TEP (45059)	972	0.001	0.032
KNIE_TEP (47390)	972	0.006	0.078
MAMMA (46201)	982	0.007	0.084
MAMMA (68100)	978	0.041	0.198
KORO_PCI (43757)	781	0.003	0.051
KORO_PCI (69889)	763	0.009	0.095
KORO_PCI (69891)	763	0.003	0.051

Table 6a: Change in Quality Scores across Waves for Input (Process) Quality Measures

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**CHOL (44800)**		
YEAR 08	2.7333***	-0.0155	-1.2204***		0.1489
	(0.536)	(0.110)	(0.337)		(0.225)
CONSTANT	95.8671***	99.0617***	99.9803***		98.6388***
	(0.257)	(0.053)	(0.161)		(0.108)
Observations	573	520	1,020		2,113
VARIABLES			**GEBH (737)**		
YEAR 08	34.0712***	8.2292***	1.0758	-18.7797***	5.2786***
	(4.275)	(2.640)	(0.723)	(3.049)	(1.611)
CONSTANT	7.0928***	67.8646***	93.3424***	99.6652***	67.0483***
	(1.636)	(1.184)	(0.339)	(1.330)	(0.700)
Observations	34.0712***	8.2292***	1.0758	-18.7797***	5.2786***
VARIABLES			**GEBH (49523)**		
YEAR 08	81.2619***	35.7666***	-0.3388		14.9015***
	(7.904)	(3.445)	(1.475)		(2.194)
CONSTANT	0.0000	51.1146***	93.5097***		62.3444***
	(0.954)	(1.373)	(0.611)		(0.743)
Observations	174	133	396		703
VARIABLES			**GEBH (82913)**		
YEAR 08	30.0357***	-2.5129***			5.2626***
	(3.089)	(0.491)			(1.019)
CONSTANT	59.6964***	99.9199***			90.0460***
	(1.277)	(0.211)			(0.433)
Observations	312	959			1,271
VARIABLES			**GYN_OP (47637)**		
YEAR 08	23.9770***	1.0717**	-1.8660***	-2.4786***	5.1620***
	(2.017)	(0.464)	(0.474)	(0.695)	(0.676)
CONSTANT	62.0699***	94.1059***	98.2650***	99.9029***	88.5454***
	(0.934)	(0.222)	(0.226)	(0.311)	(0.316)
Observations	404	420	422	375	1,621
VARIABLES			**GYN_OP (50554)**		
YEAR 08	5.5562***	-0.4212***			1.1562***
	(1.254)	(0.078)			(0.348)
CONSTANT	91.0629***	99.8227***			97.4971***
	(0.583)	(0.037)			(0.163)
Observations	450	1,245			1,695

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Table 6b: Change in Quality Scores across Waves for Input (Process) Quality Measures

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HSM_IMPL (75973)**		
YEAR 08	13.2030***	2.5791***	-0.0506	-4.3639***	3.0149***
	(1.301)	(0.454)	(0.383)	(0.923)	(0.483)
CONSTANT	78.1935***	92.0619***	96.2442***	99.7406***	91.4132***
	(0.627)	(0.219)	(0.186)	(0.433)	(0.232)
Observations	415	400	420	384	1,619
VARIABLES			**HSM_IMPL (9962)**		
YEAR 08	24.0877***	7.3877***	1.8858***	-1.9354***	7.8762***
	(1.464)	(0.324)	(0.362)	(0.376)	(0.536)
CONSTANT	69.7561***	88.7884***	94.0155***	98.7591***	87.7753***
	(0.692)	(0.158)	(0.175)	(0.177)	(0.256)
Observations	387	386	393	376	1,542
VARIABLES			**KAROT (9556)**		
YEAR 08	20.5810***	0.0990	-6.6500***		2.3102**
	(2.609)	(0.886)	(1.053)		(1.042)
CONSTANT	68.8936***	91.8447***	99.1531***		89.4595***
	(1.225)	(0.433)	(0.470)		(0.483)
Observations	213	215	399		827
VARIABLES			**KORO_PCI (43757)**		
YEAR 08	14.6009***	2.0206***	-1.0375**	-4.7327***	2.8610***
	(1.838)	(0.444)	(0.443)	(0.938)	(0.625)
CONSTANT	73.1508***	90.0059***	94.8829***	99.3416***	89.2376***
	(0.870)	(0.217)	(0.205)	(0.431)	(0.294)
Observations	279	285	273	270	1,107
VARIABLES			**MAMMA (46201)**		
YEAR 08	14.7479***	1.1658**	-2.9870***		2.2378***
	(2.036)	(0.533)	(0.662)		(0.642)
CONSTANT	74.3684***	97.2185***	99.7553***		92.9765***
	(0.881)	(0.255)	(0.299)		(0.292)
Observations	386	426	793		1,605
VARIABLES			**MAMMA (68100)**		
YEAR 08	36.1376***	6.2795***	-7.1564***		6.2658***
	(2.769)	(1.096)	(1.111)		(1.092)
CONSTANT	39.5828***	84.2342***	98.7077***		80.5248***
	(1.122)	(0.536)	(0.496)		(0.489)
Observations	348	395	703		1,446

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Table 7a: Change in Quality Scores across Waves for Output Quality Measures

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**KORO_PCI (69891)**		
YEAR 08	29.0208***	2.0822***	-0.5516*	-3.6827***	4.8646***
	(4.418)	(0.385)	(0.312)	(0.642)	(1.011)
CONSTANT	48.3229***	91.3836***	95.3277***	99.6300***	84.9487***
	(1.568)	(0.185)	(0.148)	(0.260)	(0.439)
Observations	186	233	229	200	848
VARIABLES			**KORO_PCI (69889)**		
YEAR 08	-10.5733***	0.3132	0.5605**	3.0276***	-2.0256***
	(2.016)	(0.320)	(0.213)	(1.134)	(0.710)
CONSTANT	16.7353***	3.8638***	1.2355***	4.44E-16	5.5936***
	(0.963)	(0.154)	(0.101)	(0.410)	(0.313)
Observations	222	221	132	271	846
VARIABLES			**CHOL (44927)**		
YEAR 08	-2.9400***	-0.1172	0.3484**	1.0403***	-0.2439
	(0.585)	(0.075)	(0.128)	(0.081)	(0.157)
CONSTANT	4.0204***	1.1498***	0.5123***	-9.99E-16	1.2934***
	(0.277)	(0.037)	(0.061)	(0.039)	(0.075)
Observations	509	512	65	977	-0.2439
VARIABLES			**HSM_IMPL (11255)**		
YEAR 08	-3.0279***	-0.2540		1.2100***	-0.1168
	(0.306)	(0.157)		(0.246)	(0.174)
CONSTANT	4.7162***	1.2061***		0.0000	1.3815***
	(0.149)	(0.075)		(0.117)	(0.083)
Observations	417	296		969	1,682
VARIABLES			**HSM_IMPL (11264)**		
YEAR 08	-4.2822***	-0.1555		1.7416***	-0.0250
	(0.406)	(0.187)		(0.184)	(0.178)
CONSTANT	7.3159***	1.5387***		2.22E-16	2.0322***
	(0.195)	(0.089)		(0.088)	(0.085)
Observations	421	233		1,038	1,692
VARIABLES			**HSM_IMPL (11265)**		
YEAR 08	-2.8148***	-0.2078*		1.3037***	0.0270
	(0.330)	(0.110)		(0.135)	(0.131)
CONSTANT	4.8772***	1.1552***		-2.22E-16	1.4042***
	(0.159)	(0.052)		(0.065)	(0.063)
Observations	435	270		1,028	1,733

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Table 7b: Change in Quality Scores across Waves for Output Quality Measures

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HUFT_TEP (45013)**		
YEAR 08	-2.8908***	-0.1866***		0.8123***	-0.2320
	(0.497)	(0.047)		(0.144)	(0.149)
CONSTANT	3.9800***	0.6236***		1.67E-16	1.0259***
	(0.239)	(0.023)		(0.068)	(0.071)
Observations	465	395		1,184	2,044
VARIABLES			**HUFT_TEP (45059)**		
YEAR 08	-4.0570***	-0.8812***	0.5021***	2.4773***	-0.5832***
	(0.326)	(0.144)	(0.124)	(0.400)	(0.155)
CONSTANT	7.6716***	3.1042***	1.4167***	0.0229	3.0986***
	(0.159)	(0.069)	(0.059)	(0.182)	(0.074)
Observations	517	504	504	494	2,019
VARIABLES			**HUFT_TEP (45108)**		
YEAR 08	-3.0488***	-0.0302		0.8377***	-0.3762***
	(0.463)	(0.064)		(0.096)	(0.138)
CONSTANT	4.2763***	0.7936***		-5.55E-17	1.2662***
	(0.227)	(0.031)		(0.045)	(0.066)
Observations	506	506		1,014	2,026
VARIABLES			**KAROT (68415)**		
YEAR 08	-6.9383***	0.6170**		2.9187***	-0.2583
	(1.660)	(0.284)		(0.363)	(0.517)
CONSTANT	9.9383***	2.0520***		6.66E-16	3.0461***
	(0.809)	(0.136)		(0.167)	(0.244)
Observations	371	196		193	762
VARIABLES			**KNIE_TEP (45059)**		
YEAR 08	-2.6448***	-0.2585	0.1190	1.1731***	-0.3922***
	(0.220)	(0.472)	(0.077)	(0.131)	(0.150)
CONSTANT	5.3194***	2.1915***	1.0129***	5.55E-16	2.1087***
	(0.106)	(0.230)	(0.037)	(0.060)	(0.071)
Observations	434	445	370	486	1,735
VARIABLES			**KNIE_TEP (47390)**		
YEAR 08	-1.3880***	-0.1040*		0.6269***	0.0326
	(0.188)	(0.060)		(0.203)	(0.135)
CONSTANT	2.5234***	0.5616***		2.78E-16	0.6755***
	(0.091)	(0.029)		(0.095)	(0.064)
Observations	407	258		1,070	1,735

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Table 8a: Change in Quality Scores across Different Organizational Forms for Process (Input) Quality Measures

VARIABLES	CHOL (44800)	GEBH (737)	GEBH (49523)	GEBH (82913)	GYN_OP (47637)	GYN_OP (50554)
PUBLIC	-2.0913	-11.3779	29.7971	-22.4912	-1.0895	0.6299
	(1.506)	(11.300)	(37.384)	(19.535)	(3.181)	(0.834)
PRIVATE	-1.2648	-9.8127	15.4414	-11.2858	5.5150	1.3908
	(1.234)	(13.366)	(33.208)	(17.691)	(6.064)	(1.439)
YEAR 08	0.1900	1.1066	15.5807***	7.1125***	4.2909***	1.6165***
	(0.331)	(2.751)	(4.047)	(1.616)	(0.985)	(0.599)
PUBLIC * YEAR 08	0.1939	8.5708**	-2.4292	-3.8075*	1.5575	-0.6155
	(0.423)	(3.446)	(4.758)	(2.181)	(1.462)	(0.809)
PRIVATE * YEAR 08	-0.8205	0.6428	7.2451	-3.6209	0.8562	-1.3579*
	(1.008)	(5.980)	(8.902)	(2.515)	(2.155)	(0.799)
CONSTANT	99.5683***	71.1632***	47.0125**	101.5269***	88.0971***	97.0684***
	(0.759)	(5.353)	(21.429)	(10.332)	(1.665)	(0.590)
Observations	2,238	1,307	798	1,390	1,802	1,838

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table 8b: Change in Quality Scores across Different Organizational Forms for Process (Input) Quality Measures

VARIABLES	HSM_IMPL (75973)	HSM_IMPL (9962)	KAROT (9556)	KORO_PCI (43757)	MAMMA (46201)	MAMMA (68100)
PUBLIC	5.4723	2.4611	4.8358	1.0452	-1.3813	-10.3059**
	(4.186)	(4.282)	(6.951)	(2.564)	(2.134)	(4.688)
PRIVATE	-3.9990	6.6807*	4.2773	0.6065	-5.8235*	1.5228
	(4.786)	(3.881)	(6.904)	(2.290)	(3.158)	(5.896)
YEAR 08	3.1730***	7.8728***	2.7789	4.4990***	1.5855**	6.2821***
	(0.743)	(0.758)	(1.701)	(1.083)	(0.803)	(1.684)
PUBLIC * YEAR 08	-0.2272	0.3800	-1.4131	-3.3447**	0.6557	-0.5071
	(1.033)	(1.138)	(2.363)	(1.439)	(1.361)	(2.383)
PRIVATE * YEAR 08	-0.1152	-1.4353	1.2926	-0.6727	2.8228	1.1868
	(1.425)	(1.839)	(2.680)	(1.627)	(2.151)	(3.441)
CONSTANT	89.5045***	85.8492***	85.8567***	88.6033***	93.8397***	84.5017***
	(1.367)	(2.021)	(4.193)	(1.369)	(1.259)	(2.277)
Observations	1,816	1,777	917	1,302	1,751	1,623

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table 9a: Change in Quality Scores across Different Organizational Forms for Output Quality Measures

VARIABLES	KORO_PCI (69891)	KORO_PCI (69889)	CHOL (44927)	HSM_IMPL (11255)	HSM_IMPL (11264)	HSM_IMPL (11265)
PUBLIC	2.6545	0.4929	0.2611	-4.6093	0.4892	0.5596
	(3.744)	(1.509)	(0.609)	(4.445)	(1.494)	(0.814)
PRIVATE	3.4157	0.9939	-0.4602	3.4128	0.4656	-0.1660
	(2.789)	(1.764)	(0.658)	(3.853)	(1.805)	(0.742)
YEAR 08	5.1687***	-2.0099*	-0.3090	-0.4215*	0.0032	0.0079
	(1.862)	(1.152)	(0.249)	(0.217)	(0.277)	(0.222)
PUBLIC * YEAR 08	1.1501	0.6145	0.0667	0.5149*	-0.1925	-0.0249
	(2.440)	(1.577)	(0.367)	(0.273)	(0.398)	(0.294)
PRIVATE * YEAR 08	-5.0087**	-1.7592	0.3017	0.4428	0.3956	0.2481
	(2.156)	(2.176)	(0.319)	(0.525)	(0.470)	(0.376)
CONSTANT	83.8166***	5.3922***	1.2488***	2.8772*	1.8036**	1.2293***
	(2.195)	(0.774)	(0.292)	(1.546)	(0.862)	(0.405)
Observations	993	1,009	2,191	1,854	1,852	1,884

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table 9b: Change in Quality Scores across Different Organizational Forms for Output Quality Measures

VARIABLES	HUFT_TEP (45013)	HUFT_TEP (45059)	HUFT_TEP (45108)	KAROT (68415)	KNIE_TEP (45059)	KNIE_TEP (47390)
PUBLIC	0.3553	1.2603	1.5534	2.9428*	-2.3923**	0.3553
	(0.284)	(0.805)	(0.972)	(1.618)	(0.953)	(0.284)
PRIVATE	-0.0436	-0.1408	1.0948	1.3866	-2.3287**	-0.0436
	(0.305)	(0.637)	(0.978)	(1.532)	(1.133)	(0.305)
YEAR 08	-0.1882	-0.2741	-0.1719	0.5947	-0.6299***	-0.1882
	(0.318)	(0.301)	(0.136)	(0.549)	(0.137)	(0.318)
PUBLIC * YEAR 08	-0.1796	-0.5633	-0.2841	-2.0294*	0.4205	-0.1796
	(0.352)	(0.357)	(0.214)	(1.126)	(0.365)	(0.352)
PRIVATE * YEAR 08	0.1782	-0.4089	-0.5227	0.7048	0.4156*	0.1782
	(0.350)	(0.420)	(0.677)	(0.893)	(0.226)	(0.350)
CONSTANT	0.9994***	2.8471***	0.5120	1.5135*	3.5020***	0.9994***
	(0.189)	(0.409)	(0.474)	(0.790)	(0.560)	(0.189)
Observations	2,166	2,155	2,159	915	1,877	1,877

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table 10a: Change in Quality Scores across Teaching Status for Process (Input) Quality Measures

VARIABLES	CHOL (44800)	GEBH (737)	GEBH (49523)	GEBH (82513)	GYN_OP (47637)	GYN_OP (50554)
YEAR 08	-0.0594	3.7360	19.9955***	6.4496***	5.5330***	1.1385**
	(0.326)	(2.679)	(4.165)	(1.534)	(0.996)	(0.472)
ACADEMIC * YEAR 08	0.5298	3.0605	-7.8218	-2.5335	-0.8832	0.0422
	(0.425)	(3.230)	(4.857)	(2.011)	(1.302)	(0.696)
CONSTANT	98.5436***	64.5957***	63.1117***	90.0001***	88.4110***	97.5452***
	(0.115)	(0.823)	(0.917)	(0.484)	(0.354)	(0.177)
Observations	2,238	1,307	798	1,390	1,802	1,838

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 10b: Change in Quality Scores across Teaching Status for Process (Input) Quality Measures

VARIABLES	HSM_IMPL (75973)	HSM_IMPL (9962)	KAROT (9556)	KORO_PCI (43757)	MAMMA (46201)	MAMMA (68100)
YEAR 08	3.2411***	9.1933***	2.3482	3.8611***	2.5911**	5.0699***
	(0.705)	(0.807)	(1.777)	(1.005)	(1.097)	(1.750)
ACADEMIC * YEAR 08	-0.5217	-3.0470***	-0.0602	-2.0039	-0.7733	2.5832
	(0.944)	(1.023)	(2.192)	(1.247)	(1.215)	(2.119)
CONSTANT	91.3145***	87.7850***	88.7833***	89.1820***	92.4032***	80.3127***
	(0.259)	(0.292)	(0.539)	(0.346)	(0.327)	(0.562)
Observations	1,817	1,778	917	1,302	1,751	1,623

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 11a: Change in Quality Scores across Teaching Status for Output Quality Measures

VARIABLES	KORO_PCI (69891)	KORO_PCI (69889)	CHOL (44927)	HSM_IMPL (11255)	HSM_IMPL (11264)	HSM_IMPL (11265)
YEAR 08	6.3609***	-4.1073***	-0.3831	-0.0442	-0.1224	-0.0047
	(1.950)	(1.410)	(0.257)	(0.286)	(0.277)	(0.198)
ACADEMIC * YEAR 08	-2.3432	3.4206**	0.3449	-0.1652	0.2147	0.0709
	(2.255)	(1.583)	(0.270)	(0.325)	(0.345)	(0.257)
CONSTANT	85.5052***	5.8469***	1.2888***	1.3647***	2.0841***	1.4495***
	(0.537)	(0.388)	(0.081)	(0.092)	(0.094)	(0.069)
Observations	993	1,009	2,191	1,855	1,852	1,885

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 11b: Change in Quality Scores across Teaching Status for Output Quality Measures

VARIABLES	HUFT_TEP (45013)	HUFT_TEP (45059)	HUFT_TEP (45108)	KAROT (68415)	KNIE_TEP (45059)	KNIE_TEP (47390)
YEAR 08	-0.0090	-0.3727*	-0.3761*	-0.1451	-0.5172***	-0.0090
	(0.155)	(0.212)	(0.212)	(0.775)	(0.112)	(0.155)
ACADEMIC * YEAR 08	-0.5576*	-0.5238*	-0.0005	-0.1796	0.3078	-0.5576*
	(0.328)	(0.307)	(0.253)	(1.033)	(0.348)	(0.328)
CONSTANT	1.1327***	3.3275***	1.3191***	3.1043***	2.1132***	1.1327***
	(0.075)	(0.080)	(0.071)	(0.289)	(0.077)	(0.075)
Observations	2,167	2,156	2,160	915	1,878	1,878

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 12a: Change in Quality Scores across Hospital Size for Process (Input) Quality Measures (Number of Beds / 100)

VARIABLES	CHOL (44800)	GEBH (737)	GEBH (49523)	GEBH (82513)	GYN_OP (47637)	GYN_OP (50554)
YEAR 08	-0.0044	5.9082**	18.0732***	8.2932***	5.7003***	1.2893***
	(0.398)	(2.889)	(4.410)	(1.680)	(1.161)	(0.479)
BEDS 06 * YEAR 08	0.0431	-0.1269	-0.4797	-0.6857***	-0.1110	-0.0346
	(0.055)	(0.318)	(0.424)	(0.205)	(0.192)	(0.065)
CONSTANT	98.5407***	64.3856***	62.7898***	89.8910***	88.3731***	97.5398***
	(0.116)	(0.862)	(0.980)	(0.495)	(0.354)	(0.178)
Observations	2,230	1,301	792	1,384	1,796	1,833

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 12b: Change in Quality Scores across Hospital Size for Process (Input) Quality Measures (Number of Beds / 100)

VARIABLES	HSM_IMPL (75973)	HSM_IMPL (9962)	KAROT (9556)	KORO_PCI (43757)	MAMMA (46201)	MAMMA (68100)
YEAR 08	2.6415***	8.8870***	3.8929**	3.6655***	2.7157**	5.1062***
	(0.818)	(0.906)	(1.928)	(1.054)	(1.179)	(1.952)
BEDS 06 * YEAR 08	0.0949	-0.2590*	-0.2868	-0.1769	-0.1170	0.2777
	(0.109)	(0.157)	(0.240)	(0.123)	(0.146)	(0.281)
CONSTANT	91.3235***	87.7655***	88.7405***	89.1514***	92.4126***	80.3116***
	(0.266)	(0.296)	(0.551)	(0.357)	(0.334)	(0.572)
Observations	1,812	1,773	914	1,299	1,747	1,620

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 13a: Change in Quality Scores across Hospital Size for Output Quality Measures (Number of Beds / 100)

VARIABLES	KORO_PCI (69891)	KORO_PCI (69889)	CHOL (44927)	HSM_IMPL (11255)	HSM_IMPL (11264)	HSM_IMPL (11265)
YEAR 08	7.7873***	-2.9592**	-0.4824*	-0.0000	-0.1592	-0.0033
	(1.927)	(1.402)	(0.255)	(0.312)	(0.299)	(0.222)
BEDS 06 * YEAR 08	-0.5322***	0.1754	0.0658**	-0.0297	0.0338	0.0077
	(0.189)	(0.153)	(0.032)	(0.038)	(0.039)	(0.028)
CONSTANT	85.4274***	5.8337***	1.2929***	1.3641***	2.0884***	1.4493***
	(0.557)	(0.487)	(0.081)	(0.095)	(0.096)	(0.070)
Observations	990	1,006	2,184	1,850	1,848	1,880

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 13b: Change in Quality Scores across Hospital Size for Output Quality Measures (Number of Beds / 100)

VARIABLES	HUFT_TEP (45013)	HUFT_TEP (45059)	HUFT_TEP (45108)	KAROT (68415)	KNIE_TEP (45059)	KNIE_TEP (47390)
YEAR 08	-0.1828	-0.2254	-0.2783*	-0.5568	-0.4367**	-0.0952
	(0.241)	(0.248)	(0.149)	(0.840)	(0.190)	(0.165)
BEDS 06 * YEAR 08	-0.0135	-0.0980**	-0.0268	0.0538	0.0120	0.0345*
	(0.041)	(0.046)	(0.029)	(0.088)	(0.033)	(0.019)
CONSTANT	1.1372***	3.3261***	1.3186***	3.1294***	2.1173***	0.6714***
	(0.076)	(0.079)	(0.070)	(0.300)	(0.077)	(0.069)
Observations	2,159	2,148	2,152	911	1,870	1,870

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 14a: How Does the Score for "*Presence of Pediatrician in Cases of Premature Infants*" Change with the Number of Hospitals Providing Care in Obstetrics within a Given Radius?

VARIABLES	GEBH (737)					
YEAR 08	5.5629	4.9575*	5.1320**	4.8576**	5.7333**	5.1811**
	(3.557)	(2.569)	(2.393)	(2.310)	(2.325)	(2.314)
NR OF HOSPITALS IN 5 KM * YEAR 08	22.1865***					
	(4.892)					
NR OF HOSPITALS IN 5 KM * YEAR 08 * GEBH (737) 06	-0.3118***					
	(0.044)					
NR OF HOSPITALS IN 10 KM * YEAR 08		10.4786***				
		(2.458)				
NR OF HOSPITALS IN 10 KM * YEAR 08 * GEBH (737) 06		-0.1433***				
		(0.025)				
NR OF HOSPITALS IN 15 KM * YEAR 08			6.4478***			
			(1.375)			
NR OF HOSPITALS IN 15 KM * YEAR 08 * GEBH (737) 06			-0.0894***			
			(0.015)			
NR OF HOSPITALS IN 20 KM * YEAR 08				4.5217***		
				(0.853)		
NR OF HOSPITALS IN 20 KM * YEAR 08 * GEBH (737) 06				-0.0625***		
				(0.009)		
NR OF HOSPITALS IN 25 KM * YEAR 08					3.2831***	
					(0.630)	
NR OF HOSPITALS IN 25 KM * YEAR 08 * GEBH (737) 06					-0.0478***	
					(0.007)	
NR OF HOSPITALS IN 30 KM * YEAR 08						2.6259***
						(0.468)
NR OF HOSPITALS IN 30 KM * YEAR 08 * GEBH (737) 06						-0.0375***
						(0.005)
CONSTANT	66.5342***	66.5342***	66.5342***	66.5342***	66.5342***	66.5342***
	(0.951)	(0.977)	(0.988)	(0.982)	(0.981)	(0.973)
Observations	1,122	1,122	1,122	1,122	1,122	1,122

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 14b: How Does the Score for "*Prenatal Corticosteroid Therapy*" Change with the Number of Hospitals Providing Care in Obstetrics within a Given Radius?

VARIABLES	GEBH (49523)					
YEAR 08	19.2676***	14.4522***	15.5522***	16.3746***	16.8846***	16.5304***
	(4.426)	(3.267)	(3.232)	(3.104)	(3.139)	(3.146)
NR OF HOSPITALS IN 5 KM * YEAR 08	32.0718***					
	(6.311)					
NR OF HOSPITALS IN 5 KM * YEAR 08 * GEBH (49523) 06	-0.4722***					
	(0.061)					
NR OF HOSPITALS IN 10 KM * YEAR 08		19.5256***				
		(3.508)				
NR OF HOSPITALS IN 10 KM * YEAR 08 * GEBH (49523) 06		-0.2550***				
		(0.037)				
NR OF HOSPITALS IN 15 KM * YEAR 08			11.2593***			
			(2.940)			
NR OF HOSPITALS IN 15 KM * YEAR 08 * GEBH (49523) 06			-0.1490***			
			(0.030)			
NR OF HOSPITALS IN 20 KM * YEAR 08				7.3072***		
				(1.594)		
NR OF HOSPITALS IN 20 KM * YEAR 08 * GEBH (49523) 06				-0.0993***		
				(0.017)		
NR OF HOSPITALS IN 25 KM * YEAR 08					5.4290***	
					(1.197)	
NR OF HOSPITALS IN 25 KM * YEAR 08 * GEBH (49523) 06					-0.0758***	
					(0.013)	
NR OF HOSPITALS IN 30 KM * YEAR 08						4.3389***
						(0.963)
NR OF HOSPITALS IN 30 KM * YEAR 08 * GEBH (49523) 06						-0.0602***
						(0.010)
CONSTANT	61.6457***	61.6457***	61.6457***	61.6457***	61.6457***	61.6457***
	(0.561)	(0.607)	(0.647)	(0.641)	(0.634)	(0.622)
Observations	680	680	680	680	680	680

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 14c: How Does the Score for "*E-E-Time in Emergency Cases of Caesarean*" Change with the Number of Hospitals Providing Care in Obstetrics within a Given Radius?

VARIABLES	GEBH (82913)					
YEAR 08	1.5675	2.6708**	4.2170***	3.1025***	3.9516***	3.8510***
	(1.461)	(1.068)	(1.253)	(1.166)	(1.262)	(1.302)
NR OF HOSPITALS IN 5 KM * YEAR 08	67.0350***					
	(7.392)					
NR OF HOSPITALS IN 5 KM * YEAR 08 * GEBH (82913) 06	-0.6986***					
	(0.071)					
NR OF HOSPITALS IN 10 KM * YEAR 08		44.8365***				
		(4.492)				
NR OF HOSPITALS IN 10 KM * YEAR 08 * GEBH (82913) 06		-0.4681***				
		(0.046)				
NR OF HOSPITALS IN 15 KM * YEAR 08			24.8847***			
			(4.085)			
NR OF HOSPITALS IN 15 KM * YEAR 08 * GEBH (82913) 06			-0.2631***			
			(0.041)			
NR OF HOSPITALS IN 20 KM * YEAR 08				20.2548***		
				(2.165)		
NR OF HOSPITALS IN 20 KM * YEAR 08 * GEBH (82913) 06				-0.2113***		
				(0.022)		
NR OF HOSPITALS IN 25 KM * YEAR 08					15.0132***	
					(1.869)	
NR OF HOSPITALS IN 25 KM * YEAR 08 * GEBH (82913) 06					-0.1577***	
					(0.019)	
NR OF HOSPITALS IN 30 KM * YEAR 08						10.9340***
						(1.244)
NR OF HOSPITALS IN 30 KM * YEAR 08 * GEBH (82913) 06						-0.1150***
						(0.012)
CONSTANT	89.9988***	89.9988***	89.9988***	89.9988***	89.9988***	89.9988***
	(0.259)	(0.293)	(0.328)	(0.311)	(0.317)	(0.314)
Observations	1,245	1,245	1,245	1,245	1,245	1,245

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table 15a: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**CHOL (44800)**		
YEAR 08	2.6518***	0.0960	-1.4452***		0.0209
	(0.556)	(0.096)	(0.455)		(0.276)
CONSTANT	96.0046***	99.0566***	99.9851***		98.6972***
	(0.262)	(0.046)	(0.214)		(0.139)
Observations	414	371	762		1,547
VARIABLES			**GEBH (737)**		
YEAR 08	34.9151***	7.5074**	1.9545***	-20.9072***	5.9755***
	(4.824)	(3.351)	(0.715)	(3.839)	(2.036)
CONSTANT	6.7709**	68.0357***	93.2597***	99.6574***	64.7287***
	(1.827)	(1.447)	(0.329)	(1.634)	(0.998)
Observations	227	176	202	195	800
VARIABLES			**GEBH (49523)**		
YEAR 08	87.9063***	34.9059***	-1.2725		15.3333***
	(6.976)	(3.582)	(1.890)		(2.781)
CONSTANT	1.78E-15	52.9079***	93.8865***		62.2344***
	(0.893)	(1.368)	(0.764)		(1.123)
Observations	125	89	272		486
VARIABLES			**GEBH (82913)**		
YEAR 08	29.8452***	-2.4375***			5.9879***
	(3.524)	(0.629)			(1.268)
CONSTANT	58.5557***	99.9237***			89.1280***
	(1.443)	(0.257)			(0.579)
Observations	232	657			889
VARIABLES			**GYN_OP (47637)**		
YEAR 08	26.8275***	1.3653***	-1.5717***	-2.9508***	5.8969***
	(2.487)	(0.496)	(0.502)	(0.958)	(0.849)
CONSTANT	59.9668***	94.2443***	98.2681***	99.9156***	88.0919***
	(1.130)	(0.235)	(0.235)	(0.418)	(0.439)
Observations	295	304	312	275	1,186
VARIABLES			**GYN_OP (50554)**		
YEAR 08	5.5653***	-0.3941***			1.1372***
	(1.511)	(0.088)			(0.407)
CONSTANT	90.7870***	99.8255***			97.4811***
	(0.688)	(0.041)			(0.205)
Observations	325	928			1,253

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Table15b: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HSM_IMPL (75973)**		
YEAR 08	12.7229***	2.5639***	0.0392	-4.1514***	2.8154***
	(1.459)	(0.547)	(0.449)	(0.960)	(0.532)
CONSTANT	78.5533***	92.0541***	96.2373***	99.7389***	91.6875***
	(0.996)	(0.374)	(0.309)	(0.641)	(0.376)
Observations	302	291	321	298	1,212
VARIABLES			**HSM_IMPL (9962)**		
YEAR 08	24.1953***	7.6105***	1.8416***	-1.7291***	8.0610***
	(1.616)	(0.361)	(0.433)	(0.395)	(0.613)
CONSTANT	69.6383***	88.8531***	94.0356***	98.7269***	87.6771***
	(1.085)	(0.249)	(0.296)	(0.266)	(0.436)
Observations	298	291	272	299	1,160
VARIABLES			**KAROT (9556)**		
YEAR 08	21.6663***	0.5300	-5.8727***		3.7481***
	(2.873)	(0.968)	(0.821)		(1.152)
CONSTANT	68.5495***	91.7842***	99.1441***		88.7450***
	(1.375)	(0.469)	(0.364)		(0.601)
Observations	186	165	313		664
VARIABLES			**KORO_PCI (43757)**		
YEAR 08	15.1257***	2.2140***	-0.9469*	-3.7274***	3.4083***
	(2.058)	(0.490)	(0.495)	(0.703)	(0.681)
CONSTANT	72.6310***	90.0860***	94.9202***	99.3373***	88.9649***
	(0.963)	(0.237)	(0.226)	(0.322)	(0.379)
Observations	218	215	230	188	851
VARIABLES			**MAMMA (46201)**		
YEAR 08	17.3639***	0.6731	-3.5304***		2.7311***
	(2.580)	(0.872)	(0.950)		(0.913)
CONSTANT	72.1330***	97.2751***	99.7511***		92.0369***
	(1.622)	(0.590)	(0.608)		(0.610)
Observations	279	259	544		1,082
VARIABLES			**MAMMA (68100)**		
YEAR 08	35.4551***	6.4365***	-5.9000***		7.0336***
	(3.319)	(1.318)	(1.197)		(1.304)
CONSTANT	39.0665***	83.8295***	98.7476***		79.8910***
	(1.974)	(0.911)	(0.758)		(0.868)
Observations	248	239	487		974

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Table 16a: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**KORO_PCI (69891)**		
YEAR 08	33.5190***	2.1068***	-0.4786	-3.4207***	5.7790***
	(5.364)	(0.440)	(0.332)	(0.659)	(1.239)
CONSTANT	44.6276***	91.4147***	95.3286***	99.6370***	84.0225***
	(2.908)	(0.300)	(0.224)	(0.394)	(0.830)
Observations	147	189	187	146	669
VARIABLES			**KORO_PCI (69889)**		
YEAR 08	-10.2204***	0.4977	0.6460**	1.8819***	-2.1832***
	(2.154)	(0.342)	(0.252)	(0.555)	(0.702)
CONSTANT	16.5209***	3.7906***	1.1753***	-2.22E-16	5.5431***
	(1.015)	(0.162)	(0.119)	(0.302)	(0.372)
Observations	174	181	102	207	664
VARIABLES			**CHOL (44927)**		
YEAR 08	-3.3889***	-0.0803	0.3440**	1.0296***	-0.3303
	(0.820)	(0.091)	(0.148)	(0.094)	(0.214)
CONSTANT	4.4129***	1.1424***	0.5189***	-3.89E-16	1.3738***
	(0.549)	(0.063)	(0.100)	(0.064)	(0.148)
Observations	366	360	53	716	1,495
VARIABLES			**HSM_IMPL (11255)**		
YEAR 08	-3.1995***	-0.3605***		0.9674***	-0.3308**
	(0.368)	(0.126)		(0.138)	(0.144)
CONSTANT	4.7793***	1.2048***		-5.55E-17	1.4081***
	(0.254)	(0.086)		(0.093)	(0.101)
Observations	322	214		740	1,276
VARIABLES			**HSM_IMPL (11264)**		
YEAR 08	-4.1433***	-0.2033		1.7867***	-0.0147
	(0.474)	(0.219)		(0.217)	(0.210)
CONSTANT	7.2792***	1.4989***		-9.99E-16	2.0837***
	(0.322)	(0.148)		(0.147)	(0.147)
Observations	331	165		779	1,275
VARIABLES			**HSM_IMPL (11265)**		
YEAR 08	-2.8064***	-0.2180*		1.3128***	-0.0031
	(0.364)	(0.130)		(0.157)	(0.153)
CONSTANT	4.8009***	1.1634***		1.11E-16	1.4314***
	(0.249)	(0.087)		(0.107)	(0.107)
Observations	344	191		774	1,309

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Table 16b: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HUFT_TEP (45013)**		
YEAR 08	-3.3754***	-0.2450***		0.8394***	-0.3708*
	(0.617)	(0.053)		(0.171)	(0.190)
CONSTANT	4.3943***	0.6249***		-5.55E-17	1.1587***
	(0.421)	(0.036)		(0.115)	(0.131)
Observations	371	269		912	1,552
VARIABLES			**HUFT_TEP (45059)**		
YEAR 08	-4.2913***	-0.8221***	0.5120***	2.2804***	-0.7519***
	(0.376)	(0.175)	(0.151)	(0.356)	(0.172)
CONSTANT	7.9603***	3.1097***	1.4319***	0.0176	3.2581***
	(0.260)	(0.119)	(0.102)	(0.230)	(0.119)
Observations	417	362	370	380	1,529
VARIABLES			**HUFT_TEP (45108)**		
YEAR 08	-3.2985***	-0.0156		0.8360***	-0.4314**
	(0.607)	(0.081)		(0.111)	(0.178)
CONSTANT	4.5839***	0.8155***		5.55E-17	1.3337***
	(0.421)	(0.055)		(0.074)	(0.123)
Observations	382	368		788	1,538
VARIABLES			**KAROT (68415)**		
YEAR 08	-7.4935***	0.6157**		2.8860***	-0.4905
	(2.002)	(0.284)		(0.396)	(0.632)
CONSTANT	10.4899***	2.0176***		1.33E-15	3.2464***
	(1.382)	(0.192)		(0.262)	(0.452)
Observations	159	148		297	606
VARIABLES			**KNIE_TEP (45059)**		
YEAR 08	-2.7893***	-0.7660***	0.1146	1.1737***	-0.5427***
	(0.263)	(0.134)	(0.088)	(0.144)	(0.106)
CONSTANT	5.4101***	2.1665***	0.9975***	1.11E-16	2.0986***
	(0.179)	(0.092)	(0.059)	(0.094)	(0.073)
Observations	336	329	276	396	1,337
VARIABLES			**KNIE_TEP (47390)**		
YEAR 08	-1.4027***	-0.1209*		0.4399***	-0.0806
	(0.231)	(0.068)		(0.049)	(0.070)
CONSTANT	2.6123***	0.5500***		3.33E-16	0.6838***
	(0.159)	(0.047)		(0.033)	(0.049)
Observations	311	190		840	1,341

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Table 17a: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals with Documentation Errors are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**CHOL (44800)**		
YEAR 08	2.8361***	0.0888	-0.9720***		0.3215
	(0.535)	(0.075)	(0.269)		(0.201)
CONSTANT	95.8594***	99.0612***	99.9802***		98.6369***
	(0.255)	(0.036)	(0.128)		(0.102)
Observations	571	518	1,017		2,106
VARIABLES			**GEBH (737)**		
YEAR 08	34.3809***	8.9928***	1.4120**	-18.8233***	5.6959***
	(4.303)	(2.709)	(0.706)	(3.125)	(1.645)
CONSTANT	7.1173***	67.6725***	93.3495***	99.6616***	66.9032***
	(1.638)	(1.182)	(0.327)	(1.344)	(0.815)
Observations	289	266	300	279	1,134
VARIABLES			**GEBH (49523)**		
YEAR 08	82.1450***	37.7072***	0.0703		15.4012***
	(8.249)	(3.637)	(1.531)		(2.311)
CONSTANT	-1.78E-15	51.2408***	93.6351***		62.1890***
	(0.954)	(1.328)	(0.611)		(0.917)
Observations	173	126	386		685
VARIABLES			**GEBH (82913)**		
YEAR 08	31.2128***	-2.4702***			5.4478***
	(3.080)	(0.491)			(1.021)
CONSTANT	59.6559***	99.9198***			90.1001***
	(1.256)	(0.210)			(0.482)
Observations	309	958			1,267
VARIABLES			**GYN_OP (47637)**		
YEAR 08	24.3142***	1.3488***	-1.7717***	-2.1503***	5.3722***
	(2.045)	(0.463)	(0.474)	(0.679)	(0.682)
CONSTANT	62.2316***	94.1016***	98.2658***	99.9022***	88.6129***
	(0.933)	(0.218)	(0.225)	(0.301)	(0.352)
Observations	399	414	420	372	1,605
VARIABLES			**GYN_OP (50554)**		
YEAR 08	5.9660***	-0.3872***			1.2677***
	(1.249)	(0.071)			(0.343)
CONSTANT	91.0200***	99.8225***			97.4995***
	(0.574)	(0.033)			(0.174)
Observations	446	1,244			1,690

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Table 17b: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals with Documentation Errors are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HSM_IMPL (75973)**		
YEAR 08	13.4015***	2.6212***	0.1516	-4.2642***	3.1213***
	(1.322)	(0.454)	(0.368)	(0.922)	(0.486)
CONSTANT	78.1917***	92.0628***	96.2464***	99.7399***	91.4317***
	(0.631)	(0.219)	(0.177)	(0.431)	(0.259)
Observations	411	399	417	383	1,610
VARIABLES			**HSM_IMPL (9962)**		
YEAR 08	24.2420***	7.7719***	1.9165***	-1.5490***	8.1553***
	(1.464)	(0.290)	(0.362)	(0.323)	(0.537)
CONSTANT	69.7282***	88.7975***	94.0176***	98.7673***	87.7480***
	(0.690)	(0.139)	(0.175)	(0.150)	(0.292)
Observations	386	380	392	372	1,530
VARIABLES			**KAROT (9556)**		
YEAR 08	20.5810***	0.4733	-6.3379***		2.6034**
	(2.609)	(0.898)	(1.011)		(1.040)
CONSTANT	68.8936***	91.8659***	99.1611***		89.4454***
	(1.225)	(0.430)	(0.450)		(0.531)
Observations	213	211	398		822
VARIABLES			**KORO_PCI (43757)**		
YEAR 08	14.4910***	2.0206***	-1.0375**	-4.7327***	2.8108***
	(1.849)	(0.444)	(0.443)	(0.938)	(0.624)
CONSTANT	73.2340***	90.0059***	94.8829***	99.3416***	89.2731***
	(0.871)	(0.217)	(0.205)	(0.431)	(0.343)
Observations	278	285	273	270	1,106
VARIABLES			**MAMMA (46201)**		
YEAR 08	14.9699***	1.1658**	-2.7703***		2.3398***
	(2.046)	(0.533)	(0.634)		(0.632)
CONSTANT	74.3958***	97.2185***	99.7547***		93.0208***
	(0.873)	(0.255)	(0.285)		(0.315)
Observations	382	426	791		1,599
VARIABLES			**MAMMA (68100)**		
YEAR 08	37.5160***	6.7185***	-6.3421***		6.8225***
	(2.877)	(1.139)	(1.091)		(1.112)
CONSTANT	39.2633***	84.3329***	98.7058***		80.6037***
	(1.115)	(0.538)	(0.479)		(0.552)
Observations	338	383	693		1,414

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Table 18a: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals with Documentation Errors are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**KORO_PCI (69891)**		
YEAR 08	29.4165***	2.0822***	-0.5516*	-3.6827***	4.8688***
	(4.468)	(0.385)	(0.312)	(0.642)	(1.014)
CONSTANT	48.1517***	91.3836***	95.3277***	99.6300***	84.9545***
	(1.570)	(0.185)	(0.148)	(0.260)	(0.523)
Observations	185	233	229	200	847
VARIABLES			**KORO_PCI (69889)**		
YEAR 08	2.0278***	0.5605**	0.2305	-10.9250***	-2.3616***
	(0.541)	(0.213)	(0.312)	(2.063)	(0.662)
CONSTANT	-0.0000	1.2355***	3.8573***	16.8344***	5.5867***
	(0.194)	(0.101)	(0.149)	(0.970)	(0.350)
Observations	270	132	220	219	841
VARIABLES			**CHOL (44927)**		
YEAR 08	-2.5646***	-0.1392*	0.3484**	1.0269***	-0.1631
	(0.434)	(0.075)	(0.128)	(0.081)	(0.123)
CONSTANT	3.8350***	1.1520***	0.5123***	-8.88E-16	1.2477***
	(0.205)	(0.036)	(0.061)	(0.038)	(0.062)
Observations	507	509	65	974	2,055
VARIABLES			**HSM_IMPL (11255)**		
YEAR 08	-3.0279***	-0.2540		1.2100***	-0.1168
	(0.306)	(0.157)		(0.246)	(0.174)
CONSTANT	4.7162***	1.2061***		0.0000	1.3815***
	(0.149)	(0.075)		(0.117)	(0.092)
Observations	417	296		969	1,682
VARIABLES			**HSM_IMPL (11264)**		
YEAR 08	-4.2836***	-0.1555		1.7249***	-0.0325
	(0.408)	(0.187)		(0.184)	(0.178)
CONSTANT	7.3143***	1.5387***		2.22E-16	2.0299***
	(0.195)	(0.089)		(0.088)	(0.093)
Observations	420	233		1,037	1,690
VARIABLES			**HSM_IMPL (11265)**		
YEAR 08	-2.8148***	-0.2078*		1.3037***	0.0270
	(0.330)	(0.110)		(0.135)	(0.131)
CONSTANT	4.8772***	1.1552***		-2.22E-16	1.4042***
	(0.159)	(0.052)		(0.065)	(0.068)
Observations	435	270		1,028	1,733

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Table 18b: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals with Documentation Errors are Excluded)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HUFT_TEP (45013)**		
YEAR 08	-2.8908***	-0.1866***		0.8123***	-0.2320
	(0.497)	(0.047)		(0.144)	(0.149)
CONSTANT	3.9800***	0.6236***		1.67E-16	1.0259***
	(0.239)	(0.023)		(0.068)	(0.076)
Observations	465	395		1,184	2,044
VARIABLES			**HUFT_TEP (45059)**		
YEAR 08	-4.0570***	-0.9125***	0.5021***	2.4773***	-0.5908***
	(0.326)	(0.141)	(0.124)	(0.400)	(0.155)
CONSTANT	7.6716***	3.1056***	1.4167***	0.0229	3.0989***
	(0.159)	(0.068)	(0.059)	(0.182)	(0.079)
Observations	517	503	504	494	2,018
VARIABLES			**HUFT_TEP (45108)**		
YEAR 08	-3.0488***	-0.0747		0.8284***	-0.3939***
	(0.463)	(0.056)		(0.095)	(0.138)
CONSTANT	4.2763***	0.7929***		5.55E-17	1.2672***
	(0.227)	(0.027)		(0.045)	(0.071)
Observations	506	504		1,013	2,023
VARIABLES			**KAROT (68415)**		
YEAR 08	-6.9383***	0.6170**		2.8835***	-0.2838
	(1.660)	(0.284)		(0.363)	(0.517)
CONSTANT	9.9383***	2.0520***		8.88E-16	3.0501***
	(0.809)	(0.136)		(0.167)	(0.289)
Observations	193	196		370	761
VARIABLES			**KNIE_TEP (45059)**		
YEAR 08	-2.6448***	-0.2880	0.1190	1.1731***	-0.4001***
	(0.220)	(0.474)	(0.077)	(0.131)	(0.150)
CONSTANT	5.3194***	2.1914***	1.0129***	5.55E-16	2.1087***
	(0.106)	(0.230)	(0.037)	(0.060)	(0.077)
Observations	434	444	370	486	1,734
VARIABLES			**KNIE_TEP (47390)**		
YEAR 08	-1.4719***	-0.1250**		0.6228***	0.0116
	(0.178)	(0.057)		(0.203)	(0.135)
CONSTANT	2.5253***	0.5626***		2.78E-16	0.6733***
	(0.086)	(0.027)		(0.095)	(0.069)
Observations	404	257		1,069	1,730

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Tables 19a: Change in the Fictitious Market Shares of Hospitals from 2006 to 2008 in Each Service Area by Quartile of Quality of the Corresponding Input (Process) Quality Indicator

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE
VARIABLES		**CHOL (44800)**		
YEAR 08	0.0022*	0.0001	-0.0014	
	(0.001)	(0.002)	(0.001)	
CONSTANT	0.1025***	0.1277***	0.0971***	
	(0.001)	(0.001)	(0.001)	
Observations	522	478	880	
VARIABLES		**GEBH (737)**		
YEAR 08	-0.0021	-0.0017	-0.0001	0.0041
	(0.001)	(0.002)	(0.004)	(0.003)
CONSTANT	0.1141***	0.1770***	0.2481***	0.1671***
	(0.001)	(0.001)	(0.002)	(0.001)
Observations	298	270	292	274
VARIABLES		**GEBH (49523)**		
YEAR 08	-0.0025	0.0024	0.0017	
	(0.002)	(0.004)	(0.003)	
CONSTANT	0.1207***	0.2365***	0.2224***	
	(0.001)	(0.002)	(0.002)	
Observations	240	136	384	
VARIABLES		**GEBH (82913)**		
YEAR 08	0.0002	-0.0003		
	(0.002)	(0.002)		
CONSTANT	0.1578***	0.1854***		
	(0.001)	(0.001)		
Observations	274	782		
VARIABLES		**GYN_OP (47637)**		
YEAR 08	0.0035	-0.0031	0.0046	-0.0058
	(0.003)	(0.003)	(0.004)	(0.004)
CONSTANT	0.1155***	0.1614***	0.1379***	0.1256***
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	358	402	394	314
VARIABLES		**GYN_OP (50554)**		
YEAR 08	-0.0030	0.0011		
	(0.003)	(0.002)		
CONSTANT	0.1344***	0.1369***		
	(0.002)	(0.001)		
Observations	398	1,070		

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Tables 19b: Change in the Fictitious Market Shares of Hospitals from 2006 to 2008 in Each Service Area by Quartile of Quality of the Corresponding Input (Process) Quality Indicator

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE
VARIABLES		**HSM_IMPL (75973)**		
YEAR 08	-0.0041	0.0012	-0.0003	0.0042
	(0.004)	(0.005)	(0.005)	(0.005)
CONSTANT	0.1604***	0.1886***	0.1950***	0.1366***
	(0.002)	(0.003)	(0.002)	(0.002)
Observations	276	302	358	212
VARIABLES		**HSM_IMPL (9962)**		
YEAR 08	-0.0056	0.0023	-0.0001	0.0034
	(0.005)	(0.004)	(0.006)	(0.005)
CONSTANT	0.1800***	0.1748***	0.1875***	0.1495***
	(0.002)	(0.002)	(0.003)	(0.002)
Observations	270	324	314	240
VARIABLES		**KAROT (9556)**		
YEAR 08	-0.0005	-0.0027	0.0055	
	(0.019)	(0.017)	(0.013)	
CONSTANT	0.3945***	0.4507***	0.3319***	
	(0.009)	(0.008)	(0.007)	
Observations	122	178	192	
VARIABLES		**KORO_PCI (43757)**		
YEAR 08	0.0193**	-0.0253	0.0027	0.0107**
	(0.008)	(0.017)	(0.005)	(0.005)
CONSTANT	0.2443***	0.3035***	0.2501***	0.2077***
	(0.004)	(0.009)	(0.003)	(0.003)
Observations	184	228	230	128
VARIABLES		**MAMMA (46201)**		
YEAR 08	-0.0138	-0.0009	0.0065	
	(0.011)	(0.006)	(0.006)	
CONSTANT	0.1364***	0.2129***	0.1748***	
	(0.005)	(0.003)	(0.003)	
Observations	230	352	536	
VARIABLES		**MAMMA (68100)**		
YEAR 08	0.0076	-0.0051	0.0004	
	(0.009)	(0.009)	(0.004)	
CONSTANT	0.1403***	0.1950***	0.1834***	
	(0.004)	(0.005)	(0.002)	
Observations	216	368	534	

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

Tables 20a: Change in the Fictitious Market Shares of Hospitals from 2006 to 2008 in Each Service Area by Quartile of Quality of the Corresponding Output Quality Indicator

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE
VARIABLES		**KORO_PCI (69891)**		
YEAR 08	0.0061	0.0004	-0.0160	0.0136***
	(0.005)	(0.006)	(0.019)	(0.005)
CONSTANT	0.1533***	0.3177***	0.3724***	0.1318***
	(0.002)	(0.003)	(0.010)	(0.002)
Observations	162	222	218	178
VARIABLES		**KORO_PCI (69889)**		
YEAR 08	-0.0103	-0.0051	-0.0086	0.0176***
	(0.021)	(0.007)	(0.006)	(0.004)
CONSTANT	0.3439***	0.3266***	0.3065***	0.0851***
	(0.010)	(0.003)	(0.003)	(0.002)
Observations	200	210	122	210
VARIABLES		**CHOL (44927)**		
YEAR 08	-0.0002	-0.0019	-0.0151***	0.0022**
	(0.002)	(0.002)	(0.005)	(0.001)
CONSTANT	0.1023***	0.1359***	0.2072***	0.0856***
	(0.001)	(0.001)	(0.002)	(0.000)
Observations	480	472	60	868
VARIABLES		**HSM_IMPL (11255)**		
YEAR 08	-0.0036	-0.0049		0.0039
	(0.004)	(0.007)		(0.003)
CONSTANT	0.1422***	0.2711***		0.1520***
	(0.002)	(0.004)		(0.002)
Observations	316	240		592
VARIABLES		**HSM_IMPL (11264)**		
YEAR 08	-0.0035	-0.0056		0.0034
	(0.004)	(0.009)		(0.003)
CONSTANT	0.1417***	0.2804***		0.1589***
	(0.002)	(0.005)		(0.001)
Observations	322	190		636
VARIABLES		**HSM_IMPL (11265)**		
YEAR 08	0.0012	-0.0088		0.0024
	(0.003)	(0.009)		(0.003)
CONSTANT	0.1351***	0.2840***		0.1570***
	(0.002)	(0.005)		(0.001)
Observations	326	212		610

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

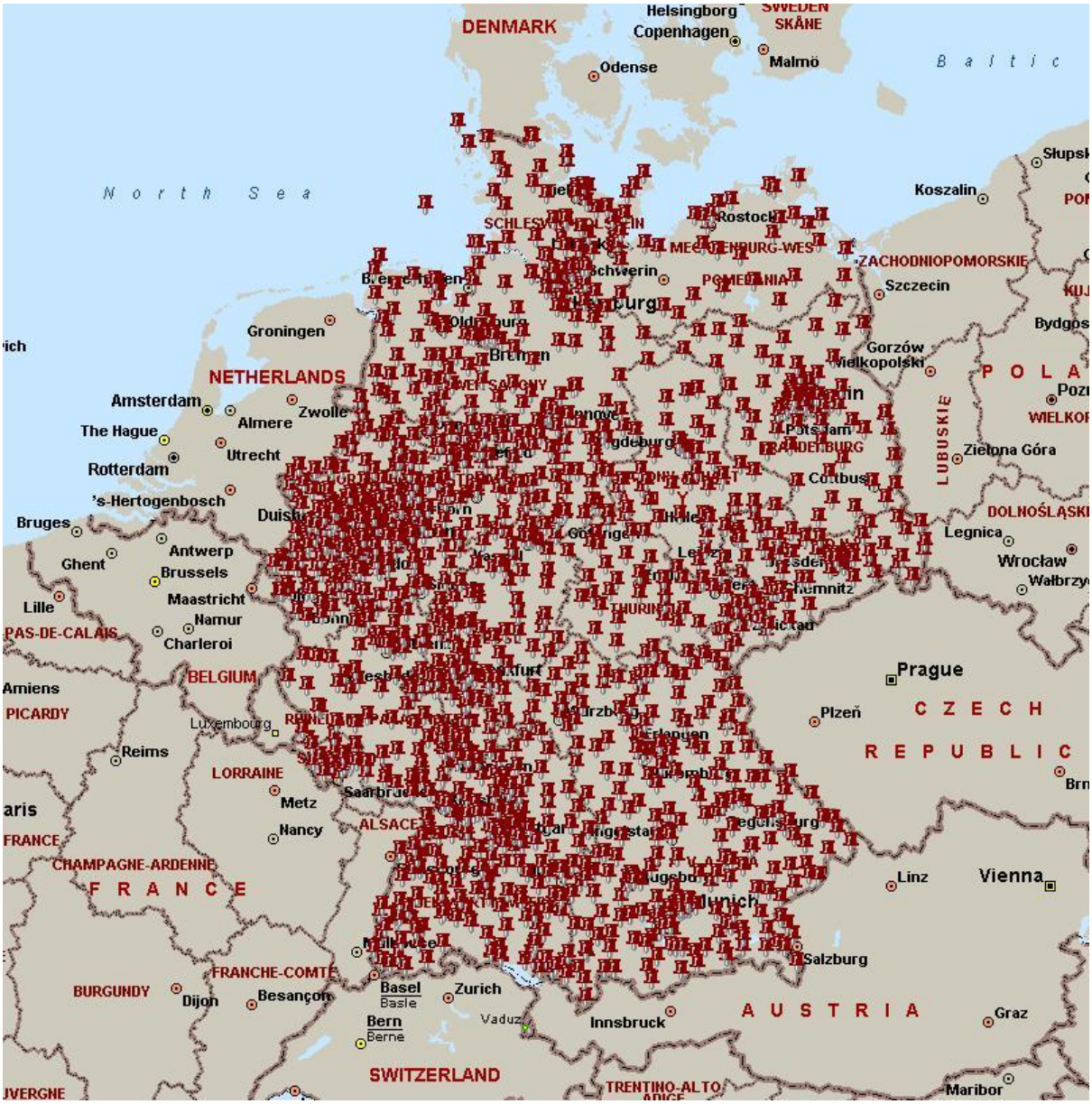
Tables 20b: Change in the Fictitious Market Shares of Hospitals from 2006 to 2008 in Each Service Area by Quartile of Quality of the Corresponding Output Quality Indicator

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE
VARIABLES		**HUFT_TEP (45013)**		
YEAR 08	0.0005	-0.0074**		0.0030**
	(0.002)	(0.003)		(0.001)
CONSTANT	0.0823***	0.2436***		0.0881***
	(0.001)	(0.002)		(0.001)
Observations	384	378		866
VARIABLES		**HUFT_TEP (45059)**		
YEAR 08	-0.0001	-0.0021	-0.0020	0.0071***
	(0.002)	(0.002)	(0.002)	(0.003)
CONSTANT	0.0714***	0.1246***	0.1860***	0.0860***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	398	472	476	282
VARIABLES		**HUFT_TEP (45108)**		
YEAR 08	0.0023	-0.0097***		0.0050***
	(0.002)	(0.003)		(0.001)
CONSTANT	0.0835***	0.2066***		0.0910***
	(0.001)	(0.001)		(0.001)
Observations	422	476		730
VARIABLES		**KAROT (68415)**		
YEAR 08	0.0080	-0.0074		0.0001
	(0.017)	(0.016)		(0.014)
CONSTANT	0.3410***	0.5261***		0.2936***
	(0.009)	(0.008)		(0.007)
Observations	140	186		182
VARIABLES		**KNIE_TEP (45059)**		
YEAR 08	0.0059**	-0.0068**	0.0009	-0.0002
	(0.002)	(0.003)	(0.003)	(0.003)
CONSTANT	0.0844***	0.2044***	0.1338***	0.1066***
	(0.001)	(0.002)	(0.001)	(0.001)
Observations	352	352	424	390
VARIABLES		**KNIE_TEP (47390)**		
YEAR 08	0.00003	-0.0072		0.0020
	(0.003)	(0.005)		(0.002)
CONSTANT	0.1031***	0.2470***		0.1121***
	(0.001)	(0.003)		(0.001)
Observations	374	246		898

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.

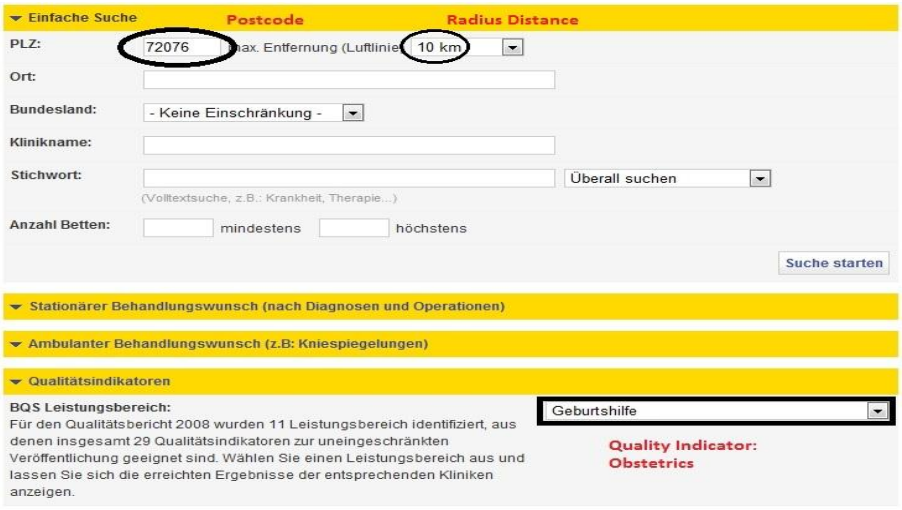
Figure 1: Spatial Distribution of the Hospitals in the Sample



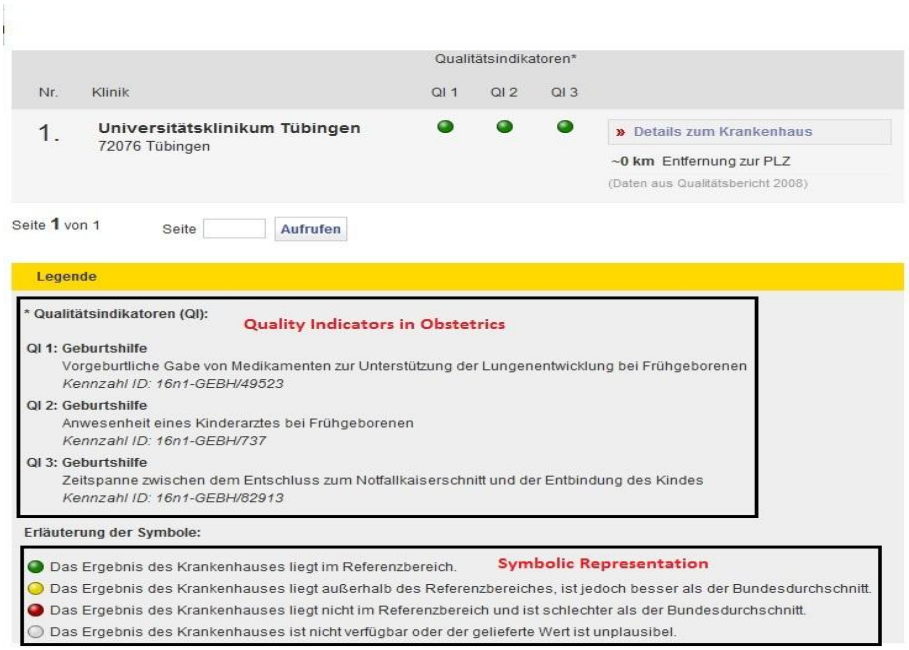
APPENDIX

Accessing Hospital and Quality Information Online

There are many websites and search engines that operationalize the quality reports. An example is http://www.bkk-klinikfinder.de/. Having logged on this website, one can enter his/her postcode information, specify the radius distance and the field in which care is sought.



Having provided the information mentioned above, one can see the list of hospitals that offer care in the relevant field in the specified geographical area. Furthermore, the quality information on the relevant indicators is also displayed in a simplified manner.



In this example, a green light refers to good quality for the relevant quality indicator (the result of the hospital lies within the reference range), a yellow light indicates average quality (the result of the hospital lies outside the reference range, but it is above the German average), while a red light indicates a lower level of quality (the result of the hospital lies outside the reference range and it is below the German average). Finally the white color means that the result of the hospital is not available or the result is implausible.

Table A6a: Change in Quality Scores across Waves for Input (Process) Quality Measures (Fixed Effects Weighted Least Squares with Hospital Dummies)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**CHOL (44800)**		
YEAR 08	2.3705***	-0.0156	-0.5345***		0.3974**
	(0.580)	(0.099)	(0.058)		(0.165)
CONSTANT	96.5138***	99.0770***	99.9579***		98.7709***
	(0.385)	(0.070)	(0.038)		(0.110)
Observations	566	520	978		2,064
VARIABLES			**GEBH (737)**		
YEAR 08	33.6799***	10.0621***	2.2236***	-12.4851***	5.2191***
	(5.387)	(2.788)	(0.561)	(2.682)	(1.322)
CONSTANT	8.2018***	70.2159***	93.4630***	99.4278***	75.5137***
	(3.040)	(1.834)	(0.384)	(1.739)	(0.856)
Observations	287	270	302	278	1,137
VARIABLES			**GEBH (49523)**		
YEAR 08	77.8100***	34.9158***	1.6777		14.2325***
	(20.439)	(4.331)	(1.270)		(2.283)
CONSTANT	0.2465	51.2796***	92.7522***		69.6189***
	(4.112)	(2.732)	(0.809)		(1.301)
Observations	172	131	391		694
VARIABLES			**GEBH (82913)**		
YEAR 08	24.2235***	-2.2174***			3.8273***
	(3.114)	(0.532)			(0.928)
CONSTANT	68.2382***	99.9055***			92.7687***
	(1.996)	(0.329)			(0.583)
Observations	309	950			1,259
VARIABLES			**GYN_OP (47637)**		
YEAR 08	22.5532***	1.2568**	-1.2618***	-3.7405	4.0469***
	(2.159)	(0.492)	(0.326)	(2.372)	(0.818)
CONSTANT	66.7890***	94.0396***	98.2437***	99.8180***	90.6321***
	(1.481)	(0.334)	(0.223)	(1.614)	(0.556)
Observations	381	417	419	339	1,556
VARIABLES			**GYN_OP (50554)**		
YEAR 08	4.8884***	-0.3292***			1.0501***
	(1.185)	(0.054)			(0.327)
CONSTANT	94.1045***	99.7415***			98.2470***
	(0.812)	(0.037)			(0.225)
Observations	436	1,195			1,631

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A6b: Change in Quality Scores across Waves for Input (Process) Quality Measures (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HSM_IMPL (75973)**		
YEAR 08	11.8043***	3.6426***	0.6362**	-1.4335***	3.5971***
	(1.583)	(0.344)	(0.268)	(0.295)	(0.415)
CONSTANT	80.7651***	92.0785***	96.2217***	99.2916***	92.2238***
	(1.092)	(0.232)	(0.181)	(0.202)	(0.282)
Observations	362	380	415	314	1,471
VARIABLES			**HSM_IMPL (9962)**		
YEAR 08	21.3946***	6.9783***	1.3916**	-1.1108***	7.1534***
	(1.574)	(0.312)	(0.596)	(0.363)	(0.602)
CONSTANT	72.8503***	88.9666***	94.0389***	98.1498***	88.4428***
	(1.068)	(0.217)	(0.403)	(0.253)	(0.412)
Observations	338	364	375	317	1,394
VARIABLES			**KAROT (9556)**		
YEAR 08	11.4496***	-0.0675	-4.9663***		0.8515
	(2.328)	(0.916)	(1.048)		(0.909)
CONSTANT	79.6337***	92.0465***	97.9353***		91.4070***
	(1.623)	(0.642)	(0.707)		(0.623)
Observations	162	208	287		657
VARIABLES			**KORO_PCI (43757)**		
YEAR 08	7.7304***	1.4891**	-0.3786	-1.8701***	1.9447***
	(1.625)	(0.575)	(0.446)	(0.583)	(0.490)
CONSTANT	80.6980***	89.9898***	94.7587***	98.5838***	90.5240***
	(1.140)	(0.351)	(0.281)	(0.394)	(0.325)
Observations	247	281	270	205	1,003
VARIABLES			**MAMMA (46201)**		
YEAR 08	7.2875***	1.4394***	-0.2669		1.4549***
	(1.418)	(0.329)	(0.165)		(0.263)
CONSTANT	89.1983***	97.3713***	99.4834***		97.1598***
	(0.865)	(0.230)	(0.112)		(0.181)
Observations	288	422	647		1,357
VARIABLES			**MAMMA (68100)**		
YEAR 08	32.5509***	9.3282***	-2.3514***		6.9860***
	(3.205)	(0.981)	(0.639)		(0.961)
CONSTANT	53.1552***	84.2127***	97.7093***		85.9701***
	(2.220)	(0.702)	(0.442)		(0.682)
Observations	251	384	604		1,239

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A7a: Change in Quality Scores across Waves for Output Quality Measures (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**KORO_PCI (69891)**		
YEAR 08	14.8930***	1.8159***	-0.4947*	-2.9623***	1.9326***
	(4.052)	(0.355)	(0.268)	(0.565)	(0.563)
CONSTANT	77.5283***	91.5474***	95.2590***	98.9860***	92.1998***
	(2.716)	(0.238)	(0.172)	(0.381)	(0.380)
Observations	151	232	229	177	789
VARIABLES			**KORO_PCI (69889)**		
YEAR 08	-4.7333***	0.1836	0.7613***	1.5692***	-1.2746***
	(0.954)	(0.385)	(0.224)	(0.452)	(0.400)
CONSTANT	11.0466***	3.9127***	1.1185***	0.1136	5.4322***
	(0.640)	(0.251)	(0.144)	(0.310)	(0.264)
Observations	217	221	132	227	797
VARIABLES			**CHOL (44927)**		
YEAR 08	-2.4791***	-0.0672	0.3499***	1.0464***	-0.1965
	(0.706)	(0.073)	(0.120)	(0.075)	(0.177)
CONSTANT	3.5528***	1.1202***	0.5071***	-0.0044	1.2513***
	(0.514)	(0.051)	(0.078)	(0.052)	(0.131)
Observations	505	509	65	936	2,015
VARIABLES			**HSM_IMPL (11255)**		
YEAR 08	-2.0064***	-0.2213*		0.6152***	-0.1803**
	(0.186)	(0.120)		(0.059)	(0.071)
CONSTANT	3.4375***	1.0859***		0.0184	1.0436***
	(0.128)	(0.077)		(0.040)	(0.048)
Observations	388	294		846	1,528
VARIABLES			**HSM_IMPL (11264)**		
YEAR 08	-2.9520***	-0.0299		1.0297***	-0.0683
	(0.277)	(0.192)		(0.103)	(0.109)
CONSTANT	5.2840***	1.3436***		0.0579	1.4806***
	(0.185)	(0.127)		(0.070)	(0.073)
Observations	396	233		922	1,551
VARIABLES			**HSM_IMPL (11265)**		
YEAR 08	-1.8675***	-0.1389		0.8966***	0.0391
	(0.234)	(0.117)		(0.085)	(0.082)
CONSTANT	3.5885***	1.0453***		0.0077	1.0233***
	(0.157)	(0.079)		(0.056)	(0.055)
Observations	403	270		907	1,580

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A7b: Change in Quality Scores across Waves for Output Quality Measures (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HUFT_TEP (45013)**		
YEAR 08	-2.5868**	-0.1387***		0.3867***	-0.3210
	(1.190)	(0.034)		(0.041)	(0.195)
CONSTANT	3.1858***	0.5372***		0.0162	0.7607***
	(0.846)	(0.023)		(0.029)	(0.141)
Observations	433	395		1,015	1,843
VARIABLES			**HUFT_TEP (45059)**		
YEAR 08	-2.8884***	-0.9918***	0.1509	1.1663***	-0.4892***
	(0.203)	(0.120)	(0.100)	(0.195)	(0.078)
CONSTANT	5.9549***	2.9881***	1.3331***	0.2190	2.3353***
	(0.140)	(0.082)	(0.067)	(0.140)	(0.053)
Observations	461	500	502	365	1,828
VARIABLES			**HUFT_TEP (45108)**		
YEAR 08	-1.9085***	-0.0445		0.5694***	-0.1821**
	(0.307)	(0.052)		(0.056)	(0.071)
CONSTANT	2.7700***	0.6446***		-0.0019	0.8139***
	(0.206)	(0.035)		(0.039)	(0.048)
Observations	479	502		853	1,834
VARIABLES			**KAROT (68415)**		
YEAR 08	-3.5719***	0.5836**		2.5677***	0.1095
	(1.220)	(0.244)		(0.337)	(0.359)
CONSTANT	6.3494***	1.9197***		0.0864	2.4739***
	(0.932)	(0.159)		(0.226)	(0.258)
Observations	161	194		247	604
VARIABLES			**KNIE_TEP (45059)**		
YEAR 08	-2.2661***	-0.4257	0.0515	1.0527***	-0.4077***
	(0.165)	(0.375)	(0.076)	(0.110)	(0.125)
CONSTANT	4.6376***	2.1112***	0.9632***	0.0067	1.9054***
	(0.117)	(0.254)	(0.053)	(0.080)	(0.085)
Observations	419	444	370	409	1,642
VARIABLES			**KNIE_TEP (47390)**		
YEAR 08	-1.0661***	-0.0853		0.5558***	0.0504
	(0.133)	(0.053)		(0.211)	(0.113)
CONSTANT	1.8449***	0.4765***		-0.0186	0.4902***
	(0.092)	(0.038)		(0.141)	(0.076)
Observations	396	257		991	1,644

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation. Hence the empty cells with the grey background.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A8a: Change in Quality Scores across Different Organizational Forms for Process (Input) Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	CHOL (44800)	GEBH (737)	GEBH (49523)	GEBH (82913)	GYN_OP (47637)	GYN_OP (50554)
PUBLIC	-2.0507	-14.1218	9.7609	-17.5439	-0.9968	-0.1320
	(1.581)	(13.317)	(35.853)	(18.136)	(2.838)	(0.572)
PRIVATE	-2.6762**	-9.3850	0.5538	-11.4632	6.9305	-0.2154
	(1.185)	(12.327)	(29.278)	(14.936)	(7.598)	(0.639)
YEAR 08	0.2433***	2.5020	13.5454***	5.7795***	3.9613***	1.1355**
	(0.087)	(2.454)	(4.353)	(1.538)	(1.056)	(0.479)
PUBLIC * YEAR 08	0.2554	6.0778**	0.2908	-3.6060*	0.8846	0.0117
	(0.390)	(3.047)	(5.407)	(2.119)	(1.490)	(0.785)
PRIVATE * YEAR 08	0.4093	-2.8601	6.0565	-2.9532	-2.8423	-0.6744
	(0.304)	(5.420)	(9.115)	(2.390)	(4.654)	(0.554)
CONSTANT	99.9888***	81.4534***	64.9354***	102.3006***	90.0673***	98.3235***
	(0.830)	(6.698)	(20.604)	(9.872)	(1.532)	(0.386)
Observations	2,176	1,296	789	1,378	1,730	1,768

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table A8b: Change in Quality Scores across Different Organizational Forms for Process (Input) Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	HSM_IMPL (75973)	HSM_IMPL (9962)	KAROT (9556)	KORO_PCI (43757)	MAMMA (46201)	MAMMA (68100)
PUBLIC	-0.0925	-0.5307	-2.4116	4.0298*	0.3478	-11.3633***
	(2.189)	(3.392)	(8.849)	(2.410)	(1.715)	(3.051)
PRIVATE	0.2175	3.2349	-0.9903	0.7968	-0.2562	-3.6691
	(2.076)	(3.140)	(8.227)	(1.803)	(1.842)	(6.059)
YEAR 08	3.2235***	7.2191***	-0.3894	2.7278***	1.2534***	4.4460***
	(0.528)	(0.840)	(1.201)	(0.980)	(0.311)	(1.290)
PUBLIC * YEAR 08	0.9405	0.5703	1.9007	-1.2101	0.4150	4.6153**
	(0.955)	(1.452)	(1.964)	(1.292)	(0.609)	(1.996)
PRIVATE * YEAR 08	-0.3108	-2.2646*	1.4124	-0.9321	0.1380	3.0025
	(1.106)	(1.344)	(2.413)	(1.275)	(0.511)	(4.471)
CONSTANT	92.0502***	88.1682***	92.6289***	88.3424***	97.0184***	91.5954***
	(1.040)	(1.739)	(5.926)	(1.400)	(1.004)	(1.718)
Observations	1,652	1,612	733	1,168	1,456	1,383

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table A9a: Change in Quality Scores across Different Organizational Forms for Output Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	KORO_PCI (69889)	KORO_PCI (69891)	CHOL (44927)	HSM_IMPL (11255)	HSM_IMPL (11264)	HSM_IMPL (11265)
PUBLIC	-0.2571	3.5634	0.5617	0.6203	0.1135	0.4341
	(1.396)	(4.607)	(0.561)	(0.767)	(1.019)	(0.719)
PRIVATE	0.8206	2.2510	-0.1681	0.5755	1.5911	0.2987
	(1.161)	(3.442)	(0.682)	(0.956)	(1.113)	(0.583)
YEAR 08	-1.5193**	1.5687	-0.1365	-0.2646*	-0.0330	0.0033
	(0.695)	(0.961)	(0.120)	(0.141)	(0.203)	(0.151)
PUBLIC * YEAR 08	0.2700	1.2387	-0.1611	0.1401	-0.1234	0.1244
	(1.025)	(1.442)	(0.428)	(0.170)	(0.253)	(0.198)
PRIVATE * YEAR 08	0.5710	-1.2160	0.0996	0.1282	0.1077	-0.1172
	(0.979)	(1.162)	(0.217)	(0.240)	(0.350)	(0.242)
CONSTANT	5.5350***	89.9774***	1.0264***	0.6817	1.1959*	0.7772*
	(0.850)	(2.929)	(0.292)	(0.504)	(0.612)	(0.412)
Observations	956	925	2,137	1,683	1,695	1,713

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table A9b: Change in Quality Scores across Different Organizational Forms for Output Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	HUFT_TEP (45013)	HUFT_TEP (45059)	HUFT_TEP (45108)	KAROT (68415)	KNIE_TEP (45059)	KNIE_TEP (47390)
PUBLIC	0.1768	1.6604*	0.5225	3.1805	-1.8063**	-0.2648
	(0.338)	(0.964)	(0.422)	(2.044)	(0.912)	(0.427)
PRIVATE	0.0788	0.1081	0.9900**	1.5185	-1.1168	0.0130
	(0.335)	(0.731)	(0.481)	(1.648)	(0.992)	(0.279)
YEAR 08	-0.5638	-0.5812***	-0.1588**	0.4786	-0.5469***	-0.0798
	(0.441)	(0.112)	(0.063)	(0.575)	(0.112)	(0.058)
PUBLIC * YEAR 08	0.3903	0.1670	0.0632	-0.7658	0.2964	0.3891
	(0.447)	(0.190)	(0.109)	(0.876)	(0.364)	(0.335)
PRIVATE * YEAR 08	0.5224	0.1761	-0.2376	0.2665	0.1915	-0.0178
	(0.448)	(0.196)	(0.299)	(0.752)	(0.171)	(0.118)
CONSTANT	0.6806***	1.7499***	0.4297**	0.6067	2.7700***	0.5761***
	(0.250)	(0.410)	(0.217)	(1.254)	(0.515)	(0.199)
Observations	1,937	1,933	1,937	727	1,762	1,764

⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

⇨ Nonprofit hospitals are excluded as the base group.

Table A10a: Change in Quality Scores across Teaching Status for Process (Input) Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	CHOL (44800)	GEBH (737)	GEBH (49523)	GEBH (82513)	GYN_OP (47637)	GYN_OP (50554)
YEAR 08	0.4854	3.4748	16.8606***	5.1416***	2.9867**	0.9717**
	(0.339)	(2.643)	(4.403)	(1.451)	(1.406)	(0.489)
ACADEMIC * YEAR 08	-0.1669	2.8600	-3.7304	-2.2341	1.9829	0.1458
	(0.354)	(3.080)	(5.285)	(1.948)	(1.750)	(0.682)
CONSTANT	98.7706***	73.4863***	69.9192***	92.7018***	90.5121***	98.2345***
	(0.115)	(0.933)	(1.451)	(0.619)	(0.590)	(0.237)
Observations	2,176	1,296	789	1,378	1,730	1,768

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A10b: Change in Quality Scores across Teaching Status for Process (Input) Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	HSM_IMPL (75973)	HSM_IMPL (9962)	KAROT (9556)	KORO_PCI (43757)	MAMMA (46201)	MAMMA (68100)
YEAR 08	3.3679***	8.3531***	0.4032	1.6985**	1.8003***	6.7295***
	(0.655)	(1.003)	(1.856)	(0.704)	(0.610)	(1.925)
ACADEMIC * YEAR 08	0.4016	-2.0732	0.6224	0.3580	-0.5450	0.4110
	(0.884)	(1.311)	(2.167)	(0.992)	(0.659)	(2.240)
CONSTANT	92.0526***	88.3933***	91.2122***	90.4892***	97.1354***	85.9472***
	(0.302)	(0.450)	(0.663)	(0.353)	(0.193)	(0.735)
Observations	1,652	1,612	733	1,168	1,456	1,383

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A11a: Change in Quality Scores across Teaching Status for Output Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	KORO_PCI (69889)	KORO_PCI (69891)	CHOL (44927)	HSM_IMPL (11255)	HSM_IMPL (11264)	HSM_IMPL (11265)
YEAR 08	-1.8283*	1.5334	-0.4266	-0.2194	-0.1954	0.0571
	(0.976)	(1.014)	(0.377)	(0.134)	(0.199)	(0.136)
ACADEMIC * YEAR 08	0.8089	0.5696	0.4337	0.0671	0.2176	-0.0310
	(1.079)	(1.264)	(0.386)	(0.159)	(0.240)	(0.174)
CONSTANT	5.5746***	92.1894***	1.2512***	1.0698***	1.5263***	1.0327***
	(0.296)	(0.415)	(0.137)	(0.052)	(0.078)	(0.058)
Observations	956	925	2,137	1,683	1,695	1,713

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A11b: Change in Quality Scores across Teaching Status for Output Quality Measures (Fixed Effects Weighted Least Squares)

VARIABLES	HUFT_TEP (45013)	HUFT_TEP (45059)	HUFT_TEP (45108)	KAROT (68415)	KNIE_TEP (45059)	KNIE_TEP (47390)
YEAR 08	-0.1372***	-0.3770***	-0.1570	0.2563	-0.4527***	-0.0526
	(0.044)	(0.103)	(0.117)	(0.436)	(0.088)	(0.055)
ACADEMIC * YEAR 08	-0.4123	-0.2525	-0.0561	-0.2070	0.1120	0.2572
	(0.448)	(0.163)	(0.139)	(0.683)	(0.308)	(0.286)
CONSTANT	0.7574***	2.3365***	0.8155***	2.5004***	1.8983***	0.4866***
	(0.145)	(0.055)	(0.049)	(0.287)	(0.089)	(0.080)
Observations	1,938	1,934	1,938	727	1,763	1,765

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A12a: Change in Quality Scores across Hospital Size for Process (Input) Quality Measures (Number of Beds / 100) (Fixed Effects Weighted Least Squares)

VARIABLES	CHOL (44800)	GEBH (737)	GEBH (49523)	GEBH (82513)	GYN_OP (47637)	GYN_OP (50554)
YEAR 08	0.4498**	5.2683**	15.3815***	6.1333***	4.1514***	1.1950**
	(0.228)	(2.346)	(4.134)	(1.512)	(1.129)	(0.493)
BEDS 06 * YEAR 08	-0.0114	-0.0081	-0.1536	-0.3936**	0.0803	-0.0297
	(0.020)	(0.220)	(0.332)	(0.170)	(0.200)	(0.050)
CONSTANT	98.7664***	73.4213***	69.8331***	92.6318***	90.4222***	98.2300***
	(0.114)	(0.948)	(1.481)	(0.624)	(0.466)	(0.238)
Observations	2,169	1,293	786	1,375	1,725	1,764

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A12b: Change in Quality Scores across Hospital Size for Process (Input) Quality Measures (Number of Beds / 100) (Fixed Effects Weighted Least Squares)

VARIABLES	HSM_IMPL (75973)	HSM_IMPL (9962)	KAROT (9556)	KORO_PCI (43757)	MAMMA (46201)	MAMMA (68100)
YEAR 08	3.4067***	8.4501***	0.7280	1.1498	2.0196***	4.9219***
	(0.656)	(1.280)	(2.179)	(0.870)	(0.407)	(1.718)
BEDS 06 * YEAR 08	0.0337	-0.2283	0.0158	0.1118	-0.0917	0.3331
	(0.064)	(0.227)	(0.285)	(0.086)	(0.068)	(0.247)
CONSTANT	92.0573***	88.3682***	91.2090***	90.5106***	97.1238***	85.9989***
	(0.304)	(0.436)	(0.647)	(0.353)	(0.184)	(0.726)
Observations	1,648	1,608	730	1,165	1,452	1,380

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A13a: Change in Quality Scores across Hospital Size for Output Quality Measures (Number of Beds / 100) (Fixed Effects Weighted Least Squares)

VARIABLES	KORO_PCI (69889)	KORO_PCI (69891)	CHOL (44927)	HSM_IMPL (11255)	HSM_IMPL (11264)	HSM_IMPL (11265)
YEAR 08	-0.3124	2.5659**	-0.4337	-0.2218*	-0.1395	0.0940
	(0.697)	(1.133)	(0.310)	(0.116)	(0.170)	(0.128)
BEDS 06 * YEAR 08	-0.1367*	-0.0885	0.0531	0.0073	0.0126	-0.0097
	(0.074)	(0.092)	(0.033)	(0.012)	(0.018)	(0.014)
CONSTANT	5.5491***	92.1611***	1.2550***	1.0702***	1.5264***	1.0316***
	(0.284)	(0.425)	(0.136)	(0.052)	(0.078)	(0.058)
Observations	953	922	2,130	1,679	1,691	1,709

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A13b: Change in Quality Scores across Hospital Size for Output Quality Measures (Number of Beds / 100) (Fixed Effects Weighted Least Squares)

VARIABLES	HUFT_TEP (45013)	HUFT_TEP (45059)	HUFT_TEP (45108)	KAROT (68415)	KNIE_TEP (45059)	KNIE_TEP (47390)
YEAR 08	-0.4306	-0.5618***	-0.2593***	0.2844	-0.3850**	0.0053
	(0.323)	(0.107)	(0.082)	(0.560)	(0.159)	(0.137)
BEDS 06 * YEAR 08	0.0273	0.0181	0.0192	-0.0218	-0.0061	0.0121
	(0.032)	(0.021)	(0.014)	(0.034)	(0.023)	(0.015)
CONSTANT	0.7625***	2.3419***	0.8197***	2.4934***	1.9073***	0.4917***
	(0.146)	(0.055)	(0.049)	(0.294)	(0.089)	(0.079)
Observations	1,930	1,926	1,930	724	1,755	1,757

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A14a: How Does the Score for "*Presence of Pediatrician in Cases of Premature Infants*" Change with the Number of Hospitals Providing Care in Obstetrics within a Given Radius? (Fixed Effects Weighted Least Squares)

VARIABLES	GEBH (737)					
YEAR 08	6.5992**	4.3890**	4.6806**	4.7150**	5.2915***	5.2808***
	(2.874)	(2.137)	(2.027)	(1.985)	(2.021)	(2.019)
NR OF HOSPITALS IN 5 KM * YEAR 08	17.6113***					
	(4.904)					
NR OF HOSPITALS IN 5 KM * YEAR 08 * GEBH (737) 06	-0.2369***					
	(0.047)					
NR OF HOSPITALS IN 10 KM * YEAR 08		8.3011***				
		(2.453)				
NR OF HOSPITALS IN 10 KM * YEAR 08 * GEBH (737) 06		-0.1003***				
		(0.025)				
NR OF HOSPITALS IN 15 KM * YEAR 08			5.4719***			
			(1.448)			
NR OF HOSPITALS IN 15 KM * YEAR 08 * GEBH (737) 06			-0.0671***			
			(0.015)			
NR OF HOSPITALS IN 20 KM * YEAR 08				3.8902***		
				(0.938)		
NR OF HOSPITALS IN 20 KM * YEAR 08 * GEBH (737) 06				-0.0485***		
				(0.010)		
NR OF HOSPITALS IN 25 KM * YEAR 08					2.9368***	
					(0.717)	
NR OF HOSPITALS IN 25 KM * YEAR 08 * GEBH (737) 06					-0.0379***	
					(0.008)	
NR OF HOSPITALS IN 30 KM * YEAR 08						2.3122***
						(0.549)
NR OF HOSPITALS IN 30 KM * YEAR 08 * GEBH (737) 06						-0.0301***
						(0.006)
CONSTANT	75.1711***	75.1499***	75.1507***	75.1523***	75.1475***	75.1494***
	(0.821)	(0.842)	(0.837)	(0.828)	(0.826)	(0.822)
Observations	1,116	1,116	1,116	1,116	1,116	1,116

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A14b: How Does the Score for "*Prenatal Corticosteroid Therapy*" Change with the Number of Hospitals Providing Care in Obstetrics within a Given Radius? (Fixed Effects Weighted Least Squares)

VARIABLES	GEBH (49523)					
YEAR 08	20.5194***	13.1857***	14.5949***	15.5225***	16.3293***	16.1219***
	(4.706)	(3.448)	(3.417)	(3.346)	(3.450)	(3.492)
NR OF HOSPITALS IN 5 KM * YEAR 08	26.8111***					
	(7.404)					
NR OF HOSPITALS IN 5 KM * YEAR 08 * GEBH (49523) 06	-0.4085***					
	(0.075)					
NR OF HOSPITALS IN 10 KM * YEAR 08		16.3905***				
		(3.837)				
NR OF HOSPITALS IN 10 KM * YEAR 08 * GEBH (49523) 06		-0.2033***				
		(0.042)				
NR OF HOSPITALS IN 15 KM * YEAR 08			9.4500***			
			(3.360)			
NR OF HOSPITALS IN 15 KM * YEAR 08 * GEBH (49523) 06			-0.1202***			
			(0.035)			
NR OF HOSPITALS IN 20 KM * YEAR 08				6.2950***		
				(1.860)		
NR OF HOSPITALS IN 20 KM * YEAR 08 * GEBH (49523) 06				-0.0826***		
				(0.020)		
NR OF HOSPITALS IN 25 KM * YEAR 08					4.7181***	
					(1.449)	
NR OF HOSPITALS IN 25 KM * YEAR 08 * GEBH (49523) 06					-0.0641***	
					(0.016)	
NR OF HOSPITALS IN 30 KM * YEAR 08						3.7843***
						(1.170)
NR OF HOSPITALS IN 30 KM * YEAR 08 * GEBH (49523) 06						-0.0516***
						(0.013)
CONSTANT	69.1642***	69.1561***	69.1669***	69.1631***	69.1506***	69.1651***
	(1.017)	(1.153)	(1.171)	(1.148)	(1.134)	(1.109)
Observations	675	675	675	675	675	675

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A14c: How Does the Score for "*E-E-Time in Emergency Cases of Caesarean*" Change with the Number of Hospitals Providing Care in Obstetrics within a Given Radius? (Fixed Effects Weighted Least Squares)

VARIABLES	GEBH (82913)					
YEAR 08	1.3781	2.0473*	3.4967***	2.7298**	3.5339**	3.6402**
	(1.414)	(1.180)	(1.304)	(1.261)	(1.383)	(1.455)
NR OF HOSPITALS IN 5 KM * YEAR 08	66.5891***					
	(6.909)					
NR OF HOSPITALS IN 5 KM * YEAR 08 * GEBH (82913) 06	-0.6915***					
	(0.069)					
NR OF HOSPITALS IN 10 KM * YEAR 08		42.2881***				
		(4.829)				
NR OF HOSPITALS IN 10 KM * YEAR 08 * GEBH (82913) 06		-0.4382***				
		(0.049)				
NR OF HOSPITALS IN 15 KM * YEAR 08			22.1555***			
			(4.533)			
NR OF HOSPITALS IN 15 KM * YEAR 08 * GEBH (82913) 06			-0.2324***			
			(0.046)			
NR OF HOSPITALS IN 20 KM * YEAR 08				18.4010***		
				(2.402)		
NR OF HOSPITALS IN 20 KM * YEAR 08 * GEBH (82913) 06				-0.1912***		
				(0.024)		
NR OF HOSPITALS IN 25 KM * YEAR 08					13.4588***	
					(1.881)	
NR OF HOSPITALS IN 25 KM * YEAR 08 * GEBH (82913) 06					-0.1409***	
					(0.019)	
NR OF HOSPITALS IN 30 KM * YEAR 08						10.1617***
						(1.352)
NR OF HOSPITALS IN 30 KM * YEAR 08 * GEBH (82913) 06						-0.1066***
						(0.014)
CONSTANT	92.7145***	92.6951***	92.6796***	92.6873***	92.6909***	92.6945***
	(0.363)	(0.441)	(0.479)	(0.455)	(0.462)	(0.459)
Observations	1,237	1,237	1,237	1,237	1,237	1,237

*: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.

Table A15a: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**CHOL (44800)**		
YEAR 08	1.9282***	0.1021	-0.5294***		0.3234***
	(0.193)	(0.089)	(0.071)		(0.079)
CONSTANT	96.9917***	99.0778***	99.9657***		98.8982***
	(0.130)	(0.061)	(0.047)		(0.053)
Observations	409	371	720		1,500
VARIABLES			**GEBH (737)**		
YEAR 08	34.8225***	9.8982**	2.4473***	-15.2493***	5.2888***
	(5.933)	(4.128)	(0.717)	(3.726)	(1.813)
CONSTANT	7.6058**	69.7543***	93.3609***	99.4404***	73.5792***
	(3.269)	(2.620)	(0.481)	(2.379)	(1.143)
Observations	224	174	201	191	790
VARIABLES			**GEBH (49523)**		
YEAR 08	87.2594***	32.0562***	0.5037		13.9486***
	(14.715)	(4.279)	(1.683)		(2.761)
CONSTANT	0.2380	54.6185***	93.1399***		69.8574***
	(2.989)	(2.705)	(1.037)		(1.527)
Observations	123	87	267		477
VARIABLES			**GEBH (82913)**		
YEAR 08	25.4351***	-2.1143***			4.5153***
	(3.901)	(0.509)			(1.191)
CONSTANT	65.9960***	99.9539***			92.0748***
	(2.477)	(0.297)			(0.725)
Observations	229	648			877
VARIABLES			**GYN_OP (47637)**		
YEAR 08	24.7786***	1.4308**	-0.9227***	-4.7786	4.6438***
	(2.682)	(0.639)	(0.273)	(3.357)	(1.103)
CONSTANT	64.6049***	94.1465***	98.2541***	99.8363***	89.9921***
	(1.825)	(0.435)	(0.179)	(2.274)	(0.743)
Observations	275	301	309	244	1,129
VARIABLES			**GYN_OP (50554)**		
YEAR 08	4.8456***	-0.3433***			0.9714***
	(1.387)	(0.063)			(0.369)
CONSTANT	94.3670***	99.7426***			98.3701***
	(0.949)	(0.043)			(0.255)
Observations	312	886			1,198

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A15b: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HSM_IMPL (75973)**		
YEAR 08	11.0433***	3.6902***	0.7870***	-1.2650***	3.4018***
	(1.751)	(0.430)	(0.301)	(0.345)	(0.452)
CONSTANT	81.6538***	92.1214***	96.2365***	99.1849***	92.6008***
	(1.205)	(0.280)	(0.199)	(0.231)	(0.305)
Observations	261	278	316	238	1,093
VARIABLES			**HSM_IMPL (9962)**		
YEAR 08	20.8776***	7.0579***	1.9904***	-0.9623**	7.3686***
	(1.649)	(0.365)	(0.421)	(0.396)	(0.663)
CONSTANT	73.6673***	88.9645***	94.0179***	98.1118***	88.5379***
	(1.109)	(0.251)	(0.275)	(0.276)	(0.451)
Observations	259	272	258	250	1,039
VARIABLES			**KAROT (9556)**		
YEAR 08	11.3980***	-0.1938	-4.8223***		1.1152
	(2.493)	(1.145)	(1.105)		(1.037)
CONSTANT	79.9280***	92.0218***	98.0751***		91.2450***
	(1.717)	(0.805)	(0.742)		(0.708)
Observations	140	161	219		520
VARIABLES			**KORO_PCI (43757)**		
YEAR 08	8.8244***	1.6388**	-0.4599	-1.6285**	2.0634***
	(2.351)	(0.662)	(0.514)	(0.625)	(0.606)
CONSTANT	79.8056***	90.0586***	94.8042***	98.4399***	90.6243***
	(1.621)	(0.391)	(0.319)	(0.407)	(0.394)
Observations	191	211	228	142	772
VARIABLES			**MAMMA (46201)**		
YEAR 08	6.7643***	1.1831**	-0.2917		1.2627***
	(1.680)	(0.524)	(0.224)		(0.339)
CONSTANT	89.4010***	97.3910***	99.4862***		97.1936***
	(0.918)	(0.362)	(0.149)		(0.224)
Observations	203	255	428		886
VARIABLES			**MAMMA (68100)**		
YEAR 08	31.1947***	9.6555***	-1.7772**		6.7768***
	(4.255)	(1.234)	(0.725)		(1.132)
CONSTANT	54.6042***	84.3811***	97.6884***		86.6637***
	(2.948)	(0.887)	(0.498)		(0.808)
Observations	173	232	410		815

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A16a: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**KORO_PCI (69891)**		
YEAR 08	15.2084***	1.7724***	-0.5315*	-2.8739***	2.0271***
	(4.666)	(0.396)	(0.287)	(0.662)	(0.643)
CONSTANT	77.5437***	91.6232***	95.3241***	99.0420***	92.1718***
	(3.061)	(0.262)	(0.180)	(0.431)	(0.424)
Observations	117	188	187	127	619
VARIABLES			**KORO_PCI (69889)**		
YEAR 08	-4.0419***	0.2047	0.7400***	1.9608***	-1.0000***
	(0.852)	(0.374)	(0.261)	(0.610)	(0.359)
CONSTANT	10.6358***	3.8748***	1.0467***	-0.0065	5.2676***
	(0.538)	(0.240)	(0.165)	(0.401)	(0.223)
Observations	170	181	102	170	623
VARIABLES			**CHOL (44927)**		
YEAR 08	-2.9138***	-0.0315	0.3424**	1.0726***	-0.2595
	(1.058)	(0.088)	(0.143)	(0.094)	(0.256)
CONSTANT	3.8982***	1.1096***	0.5133***	-0.0035	1.3164***
	(0.749)	(0.060)	(0.091)	(0.063)	(0.186)
Observations	362	357	53	677	1,449
VARIABLES			**HSM_IMPL (11255)**		
YEAR 08	-2.0360***	-0.2082		0.5696***	-0.2072**
	(0.199)	(0.144)		(0.068)	(0.081)
CONSTANT	3.3776***	1.0952***		0.0117	1.0324***
	(0.135)	(0.091)		(0.044)	(0.054)
Observations	299	212		639	1,150
VARIABLES			**HSM_IMPL (11264)**		
YEAR 08	-2.6890***	-0.1146		1.0107***	-0.1077
	(0.301)	(0.199)		(0.115)	(0.119)
CONSTANT	5.2099***	1.2540***		0.0554	1.5306***
	(0.198)	(0.126)		(0.077)	(0.078)
Observations	310	165		685	1,160
VARIABLES			**HSM_IMPL (11265)**		
YEAR 08	-1.8595***	-0.1952		0.8895***	0.0211
	(0.266)	(0.120)		(0.099)	(0.093)
CONSTANT	3.5940***	1.0775***		0.0041	1.0367***
	(0.176)	(0.078)		(0.064)	(0.061)
Observations	317	191		677	1,185

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A16b: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals for Which Documentation Rate Declined are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HUFT_TEP (45013)**		
YEAR 08	-3.0751*	-0.1901***		0.3894***	-0.4435
	(1.582)	(0.039)		(0.048)	(0.274)
CONSTANT	3.5646***	0.5504***		0.0143	0.8514***
	(1.108)	(0.026)		(0.033)	(0.194)
Observations	341	269		763	1,373
VARIABLES			**HUFT_TEP (45059)**		
YEAR 08	-2.9474***	-0.9466***	0.1431	1.1737***	-0.5090***
	(0.220)	(0.141)	(0.118)	(0.265)	(0.092)
CONSTANT	5.9799***	2.9624***	1.3396***	0.1994	2.3615***
	(0.147)	(0.095)	(0.077)	(0.188)	(0.062)
Observations	364	359	368	269	1,360
VARIABLES			**HUFT_TEP (45108)**		
YEAR 08	-1.9796***	-0.0306		0.5701***	-0.2055**
	(0.403)	(0.062)		(0.069)	(0.094)
CONSTANT	2.8294***	0.6648***		-0.0064	0.8475***
	(0.268)	(0.040)		(0.047)	(0.062)
Observations	358	364		646	1,368
VARIABLES			**KAROT (68415)**		
YEAR 08	-3.8635**	0.7061**		2.6592***	0.1978
	(1.662)	(0.275)		(0.396)	(0.450)
CONSTANT	6.6039***	1.9091***		0.0968	2.4521***
	(1.268)	(0.178)		(0.263)	(0.323)
Observations	132	146		194	474
VARIABLES			**KNIE_TEP (45059)**		
YEAR 08	-2.3135***	-0.8717***	0.0054	0.9935***	-0.5401***
	(0.199)	(0.107)	(0.081)	(0.102)	(0.076)
CONSTANT	4.5577***	2.1232***	0.9490***	0.0225	1.8487***
	(0.138)	(0.075)	(0.056)	(0.073)	(0.054)
Observations	323	328	276	327	1,254
VARIABLES			**KNIE_TEP (47390)**		
YEAR 08	-1.0562***	-0.1223**		0.3496***	-0.0624
	(0.155)	(0.052)		(0.035)	(0.047)
CONSTANT	1.8152***	0.4666***		0.0034	0.4909***
	(0.104)	(0.036)		(0.025)	(0.032)
Observations	301	189		769	1,259

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A17a: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals with Documentation Errors are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**CHOL (44800)**		
YEAR 08	2.4357***	0.0701	-0.5240***		0.4444***
	(0.581)	(0.073)	(0.057)		(0.164)
CONSTANT	96.5067***	99.0835***	99.9580***		98.7719***
	(0.385)	(0.050)	(0.038)		(0.109)
Observations	564	518	976		2,058
VARIABLES			**GEBH (737)**		
YEAR 08	33.9586***	11.4046***	2.5397***	-12.4221***	5.6691***
	(5.439)	(2.899)	(0.528)	(2.742)	(1.356)
CONSTANT	8.2202***	69.8093***	93.4739***	99.4226***	75.4060***
	(3.054)	(1.831)	(0.357)	(1.762)	(0.864)
Observations	286	264	299	275	1,124
VARIABLES			**GEBH (49523)**		
YEAR 08	78.8298***	37.0340***	2.0979		14.5360***
	(22.370)	(4.770)	(1.340)		(2.458)
CONSTANT	0.2310	51.3978***	92.8539***		69.7202***
	(4.255)	(2.740)	(0.826)		(1.332)
Observations	171	124	381		676
VARIABLES			**GEBH (82913)**		
YEAR 08	24.9511***	-2.1841***			3.9538***
	(3.158)	(0.532)			(0.932)
CONSTANT	68.2705***	99.9060***			92.8123***
	(2.000)	(0.329)			(0.583)
Observations	306	949			1,255
VARIABLES			**GYN_OP (47637)**		
YEAR 08	22.6357***	1.5659***	-1.2138***	-3.5712	4.2068***
	(2.200)	(0.493)	(0.326)	(2.414)	(0.834)
CONSTANT	66.9495***	94.0331***	98.2448***	99.8128***	90.6646***
	(1.498)	(0.330)	(0.223)	(1.633)	(0.562)
Observations	376	411	417	336	1,540
VARIABLES			**GYN_OP (50554)**		
YEAR 08	5.0006***	-0.3080***			1.0872***
	(1.200)	(0.049)			(0.328)
CONSTANT	94.0934***	99.7421***			98.2485***
	(0.819)	(0.033)			(0.226)
Observations	432	1,194			1,626

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A17b: Robustness Checks for the Change in Quality Scores across Waves for Input (Process) Quality Measures (Hospitals with Documentation Errors are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HSM_IMPL (75973)**		
YEAR 08	11.8849***	3.6603***	0.7057***	-1.3801***	3.6367***
	(1.607)	(0.345)	(0.263)	(0.290)	(0.417)
CONSTANT	80.8052***	92.0791***	96.2397***	99.2851***	92.2480***
	(1.102)	(0.232)	(0.176)	(0.198)	(0.283)
Observations	358	379	412	313	1,462
VARIABLES			**HSM_IMPL (9962)**		
YEAR 08	21.6642***	7.1899***	1.4190**	-0.7393***	7.3744***
	(1.569)	(0.293)	(0.600)	(0.279)	(0.606)
CONSTANT	72.8122***	88.9878***	94.0430***	98.1550***	88.4297***
	(1.058)	(0.200)	(0.404)	(0.188)	(0.411)
Observations	337	358	374	313	1,382
VARIABLES			**KAROT (9556)**		
YEAR 08	11.4496***	0.3168	-4.4457***		1.2272
	(2.328)	(0.925)	(0.869)		(0.889)
CONSTANT	79.6337***	92.0829***	97.9119***		91.3971***
	(1.623)	(0.636)	(0.586)		(0.603)
Observations	162	204	286		652
VARIABLES			**KORO_PCI (43757)**		
YEAR 08	7.7304***	1.4891**	-0.3786	-1.8701***	1.9447***
	(1.622)	(0.575)	(0.446)	(0.583)	(0.490)
CONSTANT	80.6995***	89.9898***	94.7587***	98.5838***	90.5245***
	(1.138)	(0.351)	(0.281)	(0.394)	(0.325)
Observations	246	281	270	205	1,002
VARIABLES			**MAMMA (46201)**		
YEAR 08	8.0073***	1.4394***	-0.1475		1.5745***
	(1.234)	(0.329)	(0.113)		(0.248)
CONSTANT	89.0628***	97.3713***	99.4717***		97.1567***
	(0.818)	(0.230)	(0.079)		(0.175)
Observations	284	422	645		1,351
VARIABLES			**MAMMA (68100)**		
YEAR 08	34.4536***	9.9552***	-1.5649***		7.5159***
	(3.505)	(0.934)	(0.566)		(0.987)
CONSTANT	53.3433***	84.3476***	97.6847***		86.2527***
	(2.281)	(0.631)	(0.385)		(0.679)
Observations	241	372	594		1,207

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A18a: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals with Documentation Errors are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**KORO_PCI (69891)**		
YEAR 08	14.8930***	1.8159***	-0.4947*	-2.9623***	1.9326***
	(4.039)	(0.355)	(0.268)	(0.565)	(0.562)
CONSTANT	77.5303***	91.5474***	95.2590***	98.9860***	92.2001***
	(2.707)	(0.238)	(0.172)	(0.381)	(0.380)
Observations	150	232	229	177	788
VARIABLES			**KORO_PCI (69889)**		
YEAR 08	-4.9035***	0.1012	0.7613***	1.5692***	-1.3242***
	(0.993)	(0.380)	(0.224)	(0.451)	(0.404)
CONSTANT	11.0449***	3.8984***	1.1185***	0.0880	5.3948***
	(0.655)	(0.245)	(0.144)	(0.309)	(0.264)
Observations	214	220	132	226	792
VARIABLES			**CHOL (44927)**		
YEAR 08	-1.8519***	-0.0848	0.3499***	1.0259***	-0.0599
	(0.191)	(0.073)	(0.120)	(0.074)	(0.068)
CONSTANT	3.2397***	1.1218***	0.5071***	-0.0044	1.1752***
	(0.131)	(0.050)	(0.078)	(0.051)	(0.047)
Observations	503	507	65	933	2,008
VARIABLES			**HSM_IMPL (11255)**		
YEAR 08	-2.0064***	-0.2213*		0.6152***	-0.1803**
	(0.186)	(0.120)		(0.059)	(0.071)
CONSTANT	3.4375***	1.0859***		0.0184	1.0436***
	(0.128)	(0.077)		(0.040)	(0.048)
Observations	388	294		846	1,528
VARIABLES			**HSM_IMPL (11264)**		
YEAR 08	-2.9482***	-0.0299		1.0111***	-0.0766
	(0.278)	(0.192)		(0.101)	(0.108)
CONSTANT	5.2789***	1.3436***		0.0584	1.4790***
	(0.186)	(0.127)		(0.068)	(0.073)
Observations	395	233		921	1,549
VARIABLES			**HSM_IMPL (11265)**		
YEAR 08	-1.8675***	-0.1389		0.8966***	0.0391
	(0.234)	(0.117)		(0.085)	(0.082)
CONSTANT	3.5885***	1.0453***		0.0077	1.0233***
	(0.157)	(0.079)		(0.056)	(0.055)
Observations	403	270		907	1,580

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.

Table A18b: Robustness Checks for the Change in Quality Scores across Waves for Output Quality Measures (Hospitals with Documentation Errors are Excluded) (Fixed Effects Weighted Least Squares)

	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE	4TH QUARTILE	ALL
VARIABLES			**HUFT_TEP (45013)**		
YEAR 08	-2.5868**	-0.1387***		0.3867***	-0.3210
	(1.190)	(0.034)		(0.041)	(0.195)
CONSTANT	3.1858***	0.5372***		0.0162	0.7607***
	(0.846)	(0.023)		(0.029)	(0.141)
Observations	433	395		1,015	1,843
VARIABLES			**HUFT_TEP (45059)**		
YEAR 08	-2.8884***	-1.0226***	0.1509	1.1663***	-0.4976***
	(0.203)	(0.116)	(0.100)	(0.195)	(0.077)
CONSTANT	5.9549***	2.9931***	1.3331***	0.2190	2.3365***
	(0.140)	(0.080)	(0.067)	(0.140)	(0.053)
Observations	461	499	502	365	1,827
VARIABLES			**HUFT_TEP (45108)**		
YEAR 08	-1.9085***	-0.0661		0.5632***	-0.1951***
	(0.307)	(0.049)		(0.056)	(0.071)
CONSTANT	2.7700***	0.6464***		-0.0016	0.8153***
	(0.206)	(0.033)		(0.039)	(0.047)
Observations	479	500		852	1,831
VARIABLES			**KAROT (68415)**		
YEAR 08	-3.5719***	0.5836**		2.5677***	0.1095
	(1.220)	(0.244)		(0.337)	(0.359)
CONSTANT	6.3494***	1.9197***		0.0805	2.4722***
	(0.932)	(0.159)		(0.226)	(0.258)
Observations	161	194		246	603
VARIABLES			**KNIE_TEP (45059)**		
YEAR 08	-2.2661***	-0.4459	0.0515	1.0527***	-0.4134***
	(0.165)	(0.376)	(0.076)	(0.110)	(0.125)
CONSTANT	4.6376***	2.1145***	0.9632***	0.0067	1.9063***
	(0.117)	(0.254)	(0.053)	(0.080)	(0.085)
Observations	419	443	370	409	1,641
VARIABLES			**KNIE_TEP (47390)**		
YEAR 08	-1.1323***	-0.1160***		0.5531***	0.0294
	(0.119)	(0.044)		(0.211)	(0.113)
CONSTANT	1.8536***	0.4777***		-0.0191	0.4910***
	(0.085)	(0.031)		(0.141)	(0.076)
Observations	393	256		990	1,639

- ⇨ *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level, t-statistics are based on robust standard errors in parentheses.
- ⇨ In some cases two or more quartiles coincided. As such it was not possible to distinguish between them and they were pooled together in the estimation.
- ⇨ The number of cases in the relevant service area is used as weights.